

APRIL 3, 1941

Engin.
Library

The IRON AGE

The TIMKEN Line

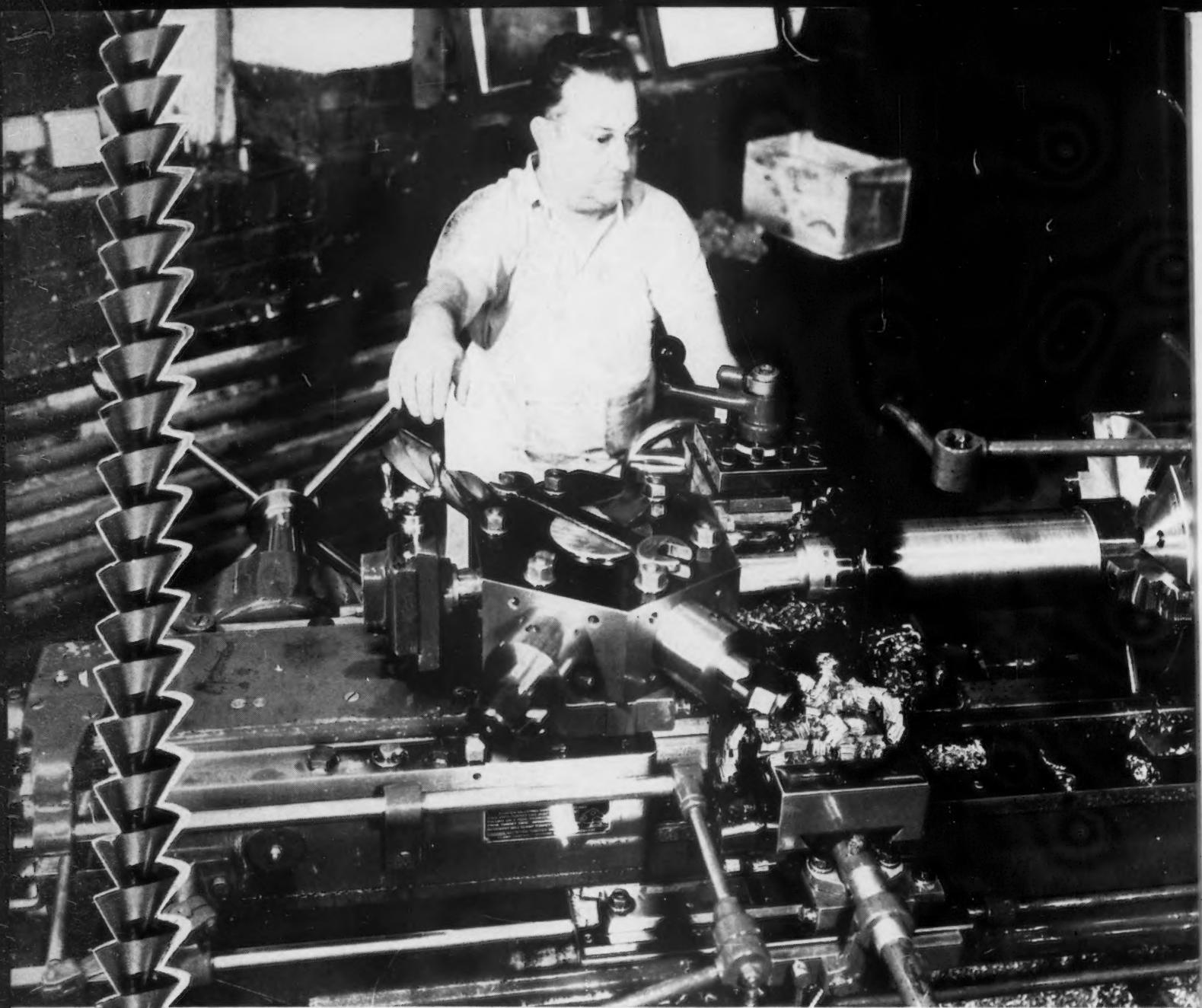
TRADE-MARK REG. U. S. PAT. OFF.

APR 4 1941



The trade-mark "TIMKEN" identifies a group of outstanding industrial products—each a leader in its field. It is your assurance of supreme quality and superior performance when buying tapered roller bearings, alloy steels, seamless steel tubing or removable rock bits.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO



An 8 Hour Operation on A Fuse Setter Reduced to 1 Hour

AT the Frankfort Arsenal at Philadelphia, machining a fuse setter for shells for a three-inch anti-aircraft gun was formerly an eight-hour operation. A new Warner & Swasey Turret Lathe cut the time to one hour.

Stepping up production 700% and holding close tolerances is a timely example of how Warner & Swasey Turret Lathes and Tools are contributing to the program of national defense. If you face turning problems on defense work, Warner & Swasey engineers can offer valuable suggestions. Write

**WARNER
&
SWASEY**
Turret Lathes
Cleveland

YOU CAN TURN IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

6. Engin.
Tools
Chem. Eng.

This Week in The Iron Age

APRIL 3, 1941

VOL. 147, NO. 14

J. H. VAN DEVENTER
President and Editor

C. S. BAUR
Vice-President and General Manager

C. E. WRIGHT J. A. ROWAN T. W. LIPPETT
Managing Editor News Editor Technical Editor

F. J. OLIVER G. RICCIARDI
Machine Tool Associate
Editor Editor

F. J. WINTERS
Art Editor

Washington Editors

L. W. MOFFETT JAMES G. ELLIS

Resident District Editors

T. C. CAMPBELL HERMAN L. KLEIN
Pittsburgh Chicago

D. R. JAMES W. F. SHERMAN
Cleveland Detroit

Editorial Correspondents

W. P. DEARING ROBERT G. MCINTOSH
Buffalo Cincinnati

G. FRAZAR CHARLES POST
Boston San Francisco

HUGH SHARP JOHN C. McCUNE
Milwaukee Birmingham

F. SANDERSON ROY M. EDMONDS
Toronto, Ontario St. Louis

LEROY W. ALLISON
Newark, N. J.

Editorial

The "All Out" 29

Technical Articles

Heat Treatment with Salt Baths	31
Plymouth Improves Handling of Small Parts	35
41 Lessons in Arc Welding	36
High Speed Steel	40
Heat Treating Aircraft Tubing	43
Three Phase Process of Spot Welding Aluminum	44
Report of Tool Engineers' Convention	46
New Equipment	50

Features

Assembly Line	56
Washington	60
On the West Coast	64
Fatigue Cracks	66

News and Market Reports

News of Industry	69	Machine Tool Activity	116
Personals	106	Non-Ferrous Market	117
Obituaries	107	Scrap Market and Prices	118
Comparison of Prices	108	Construction Steel	120
Summary of the Week	109	Iron and Steel Prices	122
The Industrial Pace	110	Ferroalloys, Pig Iron Prices	127
District Market Reports	112	Warehouse Prices	128
		Sales Possibilities	130

Products Advertised	144
Index to Advertisers	185

Copyright, 1941, by Chilton Company (Inc.)



A. H. DIX, Manager Reader Service

○ ○ ○

Advertising Staff

Emerson Findley } 621 Union Bldg., Cleveland
Robert F. Blair }
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. B. Robinson } 428 Park Bldg., Pittsburgh
W. J. Fitzgerald }
D. C. Warren, P. O. Box 81, Hartford, Conn.
Don F. Harner, 1595 Pacific Avenue, Long
Beach, Cal.

○ ○ ○

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50; Foreign, \$12.00 a year. Single copy, 25 cents.
Cable Address, "Ironage, N. Y."

Owned and Published by
CHILTON COMPANY
(Incorporated)

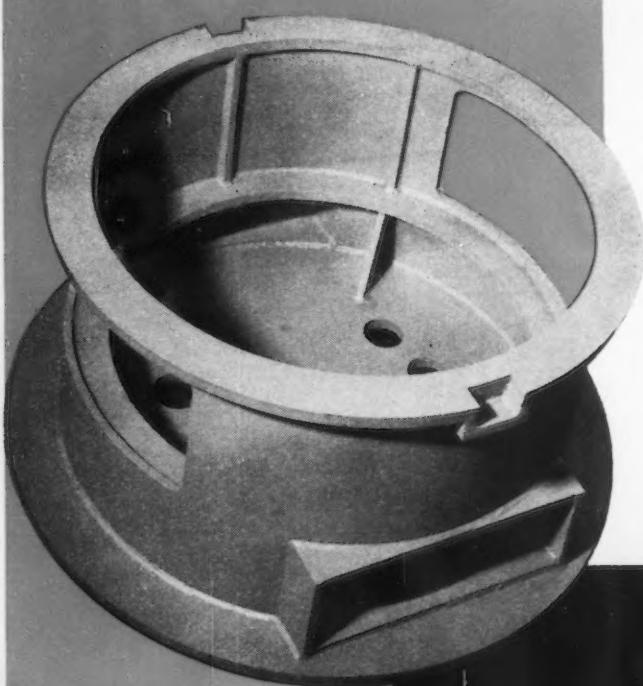
Publication Office
Chestnut and 56th Sts., Philadelphia, Pa.
U.S.A. Editorial and Executive Offices
100 East 42nd St., New York, N. Y.
U. S. A.

○ ○ ○

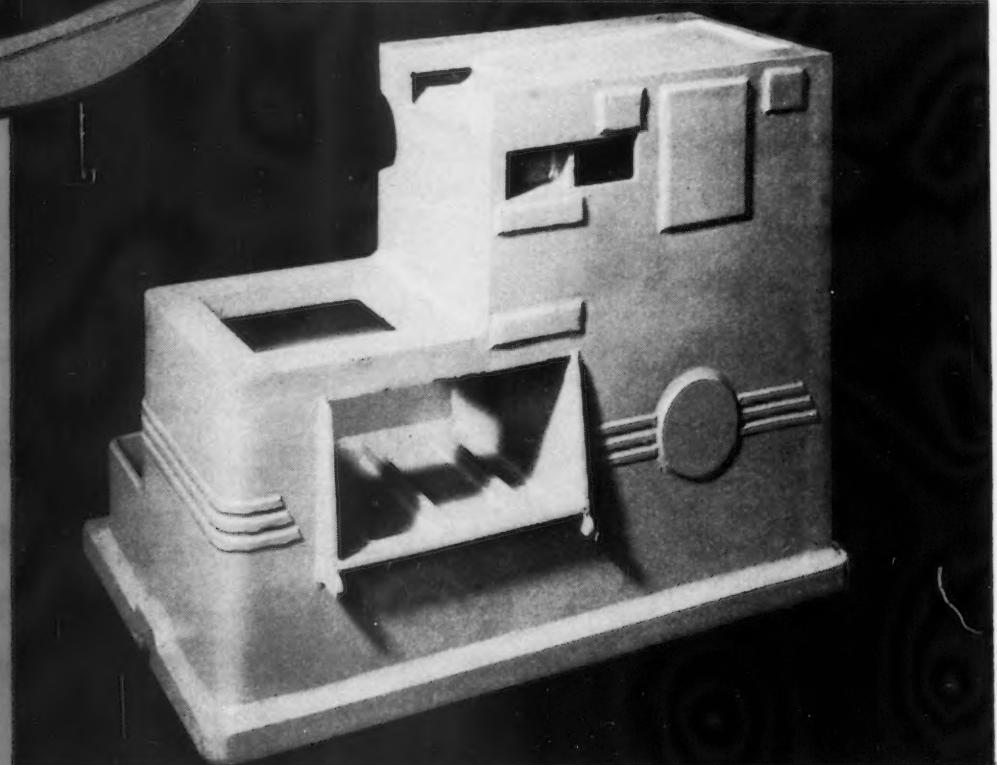
OFFICERS AND DIRECTORS

C. A. MUSSelman, President
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY CHARLES J. HEALE

Welded STEEL Machine BASES



These reproductions from un-retouched photographs of two entirely different types of welded Machine Bases produced by Mahon give you some idea of the smooth, clean-cut appearance and accuracy of detail that is possible, when built by expert craftsmen.



It takes SKILL and EXPERIENCE to produce Machine Bases like these

Welded Steel Machine Bases, as produced by Mahon, possess that sturdy strength and smooth, finished appearance which adds so greatly to the sales value of the machines for which they serve as a foundation. The reason lies in the skill of the men who make them and the excellence of the equipment with which they work. Mahon craftsmen have a knowledge of steel plate fabrication which comes only from long experience. If you want Machine Bases with that greater ACCURACY and finer APPEARANCE which matches the machines they support, get in touch with Mahon engineers. Send blueprints for quotations.

THE R. C. MAHON COMPANY
Detroit, Michigan

Manufacturers of Machine Bases and Many Other Steel Products

MAHON

The Iron Age

o o o
APRIL 3, 1941
o o o
ESTABLISHED
1855
o o o



The "All Out"

JUST a few days ago, the President of the United States appealed to his countrymen to unite in an "all out" effort to mobilize the resources of this country for national defense and aid to the democracies.

A few days later, William Knudsen, senior-half head of the OPM, made this appeal even more specific by asking for a 60 per cent increase in the industrial productivity rate.

Books have been written about words and phrases, particularly the modern "slogan" expressions that are designed to inspire action. The authors of these books have clearly shown that the same word or phrase may have entirely different meanings to different individuals.

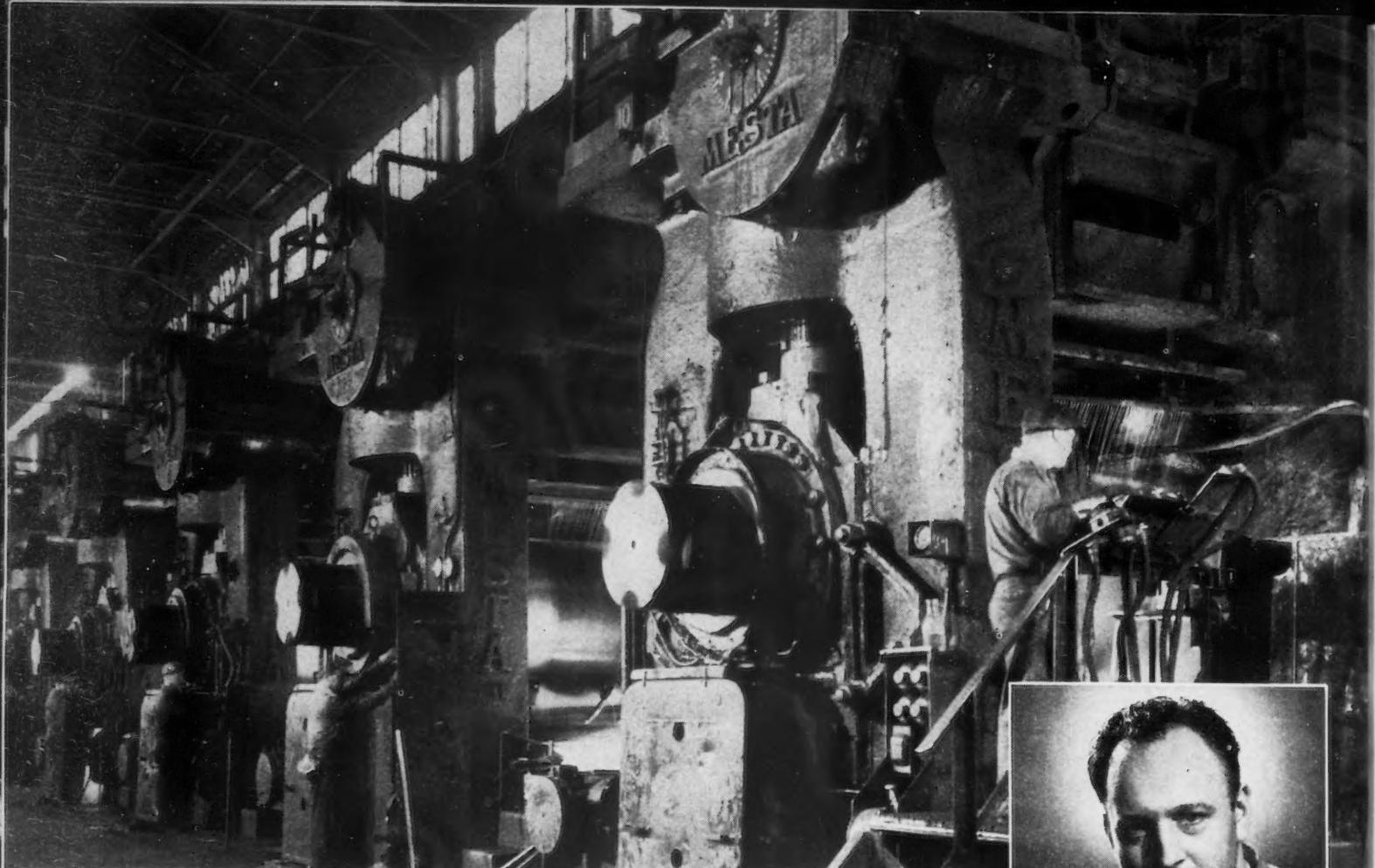
I think it is safe to say that this very modern phrase "all out" is interpreted by at least 90 per cent of our American citizens to mean just one thing. And that is that every one of us, no matter what our position in life, must exert every effort to forward the program that has been set for us through majority mandate. That we must buckle down to business, forgetting the normal ambitions for personal gain and advancement and make every minute count for production. "Time," as Mr. Knudsen tells us, "is what we have to work with and there may not be enough of it."

Unfortunately, there is a minority in this country that has accepted the "all out" mandate in its old fashioned and not its modern sense. For "all out" has been the strike slogan and command in this country in labor circles for many years. And, ironically enough, it is being so interpreted today by the new school of union labor which is so seriously sabotaging our defense efforts and so arrogantly defying both the Government and public will.

It must be gratifying to Herr Hitler to know that this rallying cry which was to turn America into a united and powerful defender of Democracy is being put to this opposite purpose. And it must indeed be disillusioning to the Administration, and particularly to Senator Wagner, to observe that those for whom they have done so much have now turned against them in this hour of need.

Before many days have passed an outraged public, which will include our great remaining army of free labor, will demand drastic action to change this battle cry from "all out" to "all in".

Joe Vannucci



Modern Mills and Skilled Men CARRY ON THE **INLAND TRADITION FOR QUALITY**

FROM the day Inland made its first steel, emphasis has always been placed on use of the most modern equipment available, the most advanced processes, and men of special training and great skill—the combination which assures highest uniform quality of steel mill products.

Because of this tradition most of Inland's steel-making and finishing equipment has been replaced within the past few years. Typical of recent improvements are: modern blast furnaces; new open hearth furnaces; a blooming mill of exceptional speed and flexibility; new 44-in. and 76-in. continuous sheet and strip mills; latest types of cold reduction mills, a completely rebuilt galvanizing department; new tin mills for production of tin plate by the modern

cold reduction method; and, new furnace and mill control devices that automatically guard quality and uniformity. The Inland steel mill is as modern as any in the world.

Operating the Inland mills are steel makers and metallurgists who know and produce uniform, high quality steel. They are men who have added much to the science of steel processing, and they can be counted on for important advancements to meet the needs of the future.

Many users of steel profit by the Inland tradition for high uniform quality. It saves them time and money. Let Inland's modern mills and skilled men go to work for you.

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATES • STRUCTURALS • PILING • RAILS • TRACK ACCESSORIES • REINFORCING BARS

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

Heat Treatment

With

Salt Baths

By LLOYD E. RAYMOND
Fairfield, Conn.

THE author herein correlates data acquired over several years and information available from several published articles and several unpublished sources. This is a very important subject today. It is possible that in some cases not sufficiently complete data are available but what issue may be taken with the conclusions arrived at. None the less, this paper will endeavor to develop the following: The effect of bath upon the core, the effect of the cyanide content of the bath, and the effect of the cyanate content of the bath—in the following paragraphs; the effect of temperature and time, the effect of the steel being treated, and the effect of "activators"—in the April 10 issue; hardening and tempering salt baths, the cyanide reheat, and equipment in general use—in the April 17 issue.

MANY years ago it was learned that if some powdered cyanide or ferrocyanide was sprinkled on red hot low-carbon steel and water quenched while the steel was still hot, it would have a "file hard" surface. As this practice of surface carburizing continued, and as 20 years ago a small tin box of cyanide in a toolmaker's chest was considered an essential tool, some bright young man conceived the idea of heating a quantity of molten cyanide to the hardening temperature and immersing the steel in it until it had become carburized to the desired depth. This was the beginning of the use of the liquid bath for carburizing, which process has become very widely used today.

Notwithstanding the extensive

¹ Transactions, A.S.M., Vol. VI, No. 2, August, 1924.
² Transactions, A.S.M., Vol. X, No. 6, December, 1926.

use of sodium cyanide in industry today, the process is more or less incompletely understood by its users. The statement made by Tour¹ 16 years ago to the effect that "much of the data available to the public on the subject of salt baths at the present time, is of the nature of sales propaganda and as such is teeming with misleading statements, intentional exaggerations and even with untruths," may still be applied to a limited extent to the information available regarding liquid carburizing baths. None the less, much factual matter can be obtained from most of the suppliers.

Effect of Bath on Core

There are misapprehensions concerning the effect of the cyanide bath upon the core of the steel being treated. One person will state that cyanide causes the core of the steel to become embrittled,

while another may consider that the treatment in the bath toughens the core. That they might have some actual data on the possible effect of the bath upon the core of low carbon steel, Messrs. Hillman and Clarke² conducted an exhaustive series of tests. They treated several tensile specimens in the cyanide bath at 1500 deg. F., removed the case and tested them. These results were compared with those obtained by pulling several specimens of the same material that had been heated to the same temperature in an open furnace and quenched in the same manner. No alteration of the properties of the core could be found from the cyanide treatment.

To further check the possible effect of a cyanide bath on the core of low carbon steel, four 12-in. lengths were cut from one bar of steel and two were treated in the sodium cyanide bath and two

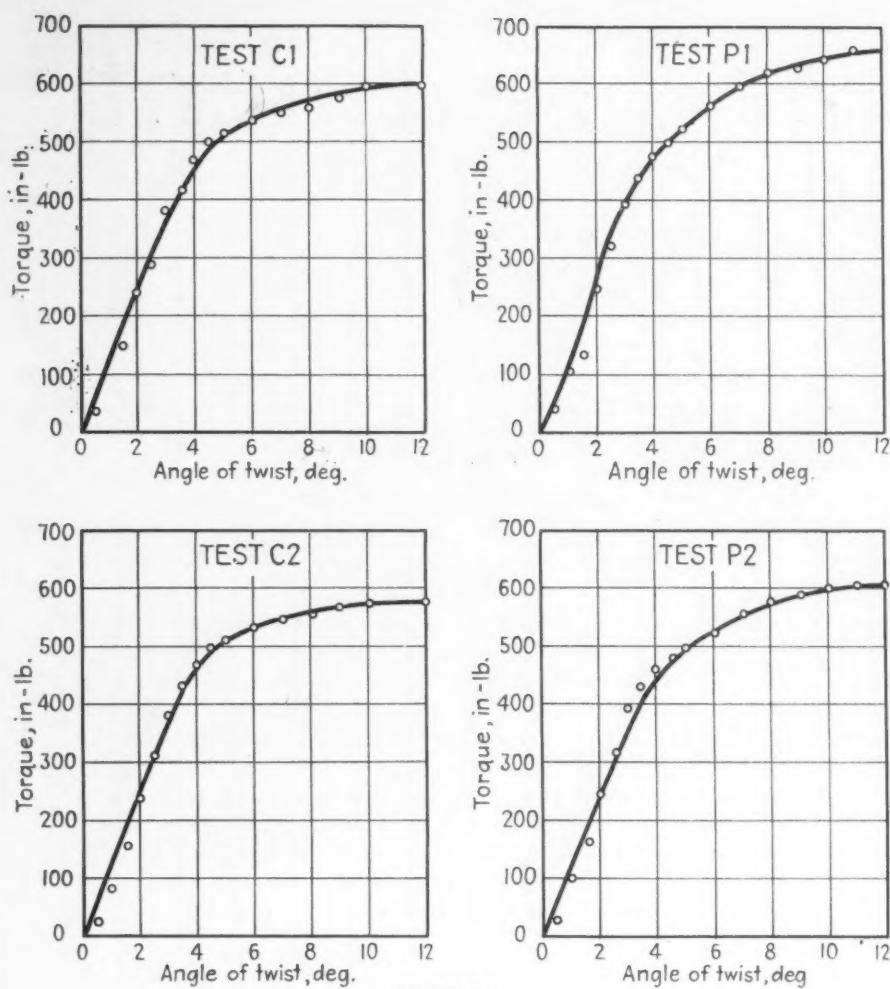


TABLE I
Cores of Cyanide Hardened Bars Tested in Torsion and Compared With Cores of Pack Carburized and Hardened Bars

Angle of Twist, Deg.	C1	C2	P1	P2
0.5	35	25	40	30
1	..	85	105	100
1.5	150	160	135	165
2	240	245	250	250
2.5	290	315	325	320
3	385	385	395	390
3.5	420	435	440	430
4	470	470	475	460
4.5	500	495	500	480
5	515	510	525	500
6	540	535	565	520
7	550	545	600	560
8	560	555	625	580
9	580	570	630	590
10	600	575	645	600
12	600	580	660	605

Tests C1 and C2 were the cores of cyanide hardened pieces. Tests P1 and P2 were the cores of pack carburized pieces. All four pieces were carburized at 1550 deg. F. and quenched from the carburizing temperature into oil. All samples were machined from the same bar.

TABLE II
Effect of Cyanide Content of the Bath

NaCN, Per Cent	Carbon Penetration (Per Cent) at Depth,				Nitrogen Penetration (Per Cent) at Depth			
	0.002	0.006	0.010	0.014	0.002	0.006	0.010	0.014
5.3*	0.05	0.04	0.00	0.00	0.76	0.16	0.02	0.00
9.3*	0.12	0.07	0.02	0.00	0.85	0.28	0.05	0.00
14.5*	0.21	0.12	0.00	0.00	0.99	0.21	0.04	0.00
19.5*	0.20	0.11	0.06	0.00	0.98	0.42	0.11	0.00
34.5	0.57	0.29	0.16	0.05	0.62	0.21	0.08	0.00
31.0	0.31	0.22	0.12	0.02	1.06	0.49	0.11	0.00
30.0*	0.42	0.27	0.12	0.05	0.82	0.40	0.10	0.00
37.8	0.31	0.25	0.09	0.00	1.08	0.46	0.07	0.00
60.0*	0.52	0.41	0.20	0.00	1.06	0.51	0.02	0.00

* Data reported as the result of independent investigations conducted by others.

FIG. 1—Results of tests on cores of bars cyanided and pack carburized and oil quenched. Vertical ordinates—torque in inch-pounds; horizontal ordinates—angle of twist in degrees. Test C1 = cyanided at 1550 deg. F. for 1 hr.; oil quenched and case ground off. Test C2 = cyanided at 1550 deg. F. for 1 hr.; oil quenched and case ground off. Test P1 = carburized 1 hr. after reaching temperature of 1550 deg. F.; oil quenched and case ground off. Test P2 = carburized 1 hr. after reaching 1550 deg. F.; oil quenched and case ground off.

pack carburized to the same depth of case and quenched from the box. All four specimens were carburized at 1550 deg. F. and oil quenched. The case was ground from all four bars and the size of all pieces held to a variation of not more than 0.0003 in. The bars were then tested in torsion by Professor G. W. Colton, then at Yale University, with the results shown in Table I and the graphs in Fig. 1.

These results clearly sustain those obtained by Hillman and Clark in their investigations, and definitely disprove the more or less prevalent beliefs regarding the core of cyanide treated steels. The core will be tough or brittle depending upon the steel treated and the temperature from which it was quenched. Figs. 2 and 3 show the cores of two different steels which have been treated in a cyanide bath and oil quenched. These were from relatively thin sections. The core of the type shown in Fig. 2 will be relatively tough as much ferrite was not transformed to austenite upon heating and some of the austenite had time to revert to fine pearlite during the quenching. A core such as shown in Fig. 3, although

a harder backing for the case if it be subject to impact stresses, is relatively brittle as it is entirely martensitic.

Effect of Cyanide Content

The amount of sodium cyanide present in the liquid bath influences the chemical composition of the case, the depth of penetration and the hardness of the case obtained. Table 2 lists several types of cases that have been reported from several sources and by personal observation of the author. A study of data in this table will indicate that low cyanide concentrations produce cases that are low in carbon, relatively high in nitrogen and quite shallow. As the cyanide content of the bath is increased, the carbon content increases and the hardness of the underlying case becomes increased.

The samples shown in Table II were obtained by heating for 1 hr. in the bath and being permitted to cool slowly while surrounded by a small quantity of the bath, that they might be machinable. The percentage of carbon shown in the table is the increment over the composition of the core. The point at which the percentage is shown was obtained as follows: A cut 0.004 in. deep was taken on the radius of the bar and analyzed. It was assumed that the average would be at a point one-half the depth of the cut and that the analysis was the composition at that point. In all cases, the samples were immersed in the bath for 1 hr. The temperatures were 1500 deg. F. and 1525 deg. F.

Effect of Cyanate Content

In operating a sodium cyanide bath over a period of years in which the NaCN content was carefully controlled by chemical analysis between 30 per cent and 40 per cent, it was found that erratic results were obtained at the most unexpected intervals. These had several undesirable manifestations, such as (1) shallow depth of hardness although microscopic examination showed that the penetration was of normal depth, (2) high surface hardness and shallow penetration, and (3) complete failure to carburize. An analysis of the bath that stopped carburizing showed that although the cyanide content was at the correct composition, there was but a trace

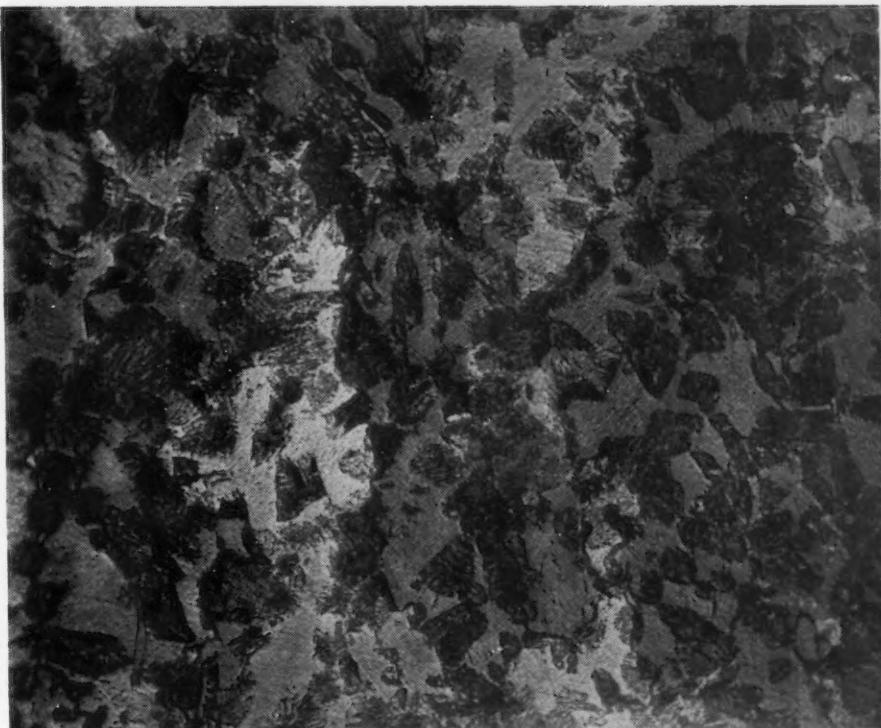


FIG. 2—Core of free machining steel (SAE 1112) treated 1.5 hr. in cyanide bath at 1500 deg. F. and oil quenched. At 500 diameters.

of sodium cyanate present in the bath. This led to a study of the effect of the cyanate content.

This study has shown that the lower cyanate content baths do not carburize with the effectiveness that the baths of higher

cyanate content do. Although the apparent depth of penetration under the microscope may seem to be practically the same, it will be found that the analysis of the case will show considerably less total hardening units of carbon

FIG. 3—Core of free machining steel (SAE 1314X) treated 1.5 hr. in cyanide bath at 1500 deg. F. and oil quenched. At 500 diameters.



TABLE III
The Effect of the Cyanate Content of the Bath on the Penetration

Steel S.A.E.	NaCNO, Per Cent	NaCN, Per Cent	0.0015 In.	Carbon Penetration at Depth of				Nitrogen Penetration at Depth of			
				0.0045 In.	0.0075 In.	0.0115 In.	0.0145 In.	0.0015 In.	0.0045 In.	0.0075 In.	0.0115 In.
5150	4.77	54.11	0.34	0.23	0.09	0.03	0.00	0.75	0.10	0.05	0.05
5150	1.61	51.93	0.12	0.02	0.01	0.00	0.00	0.34	0.05	0.05	0.04
6150	5.28	55.35	0.28	0.29	0.13	0.05	0.02	0.65	0.12	0.04	0.05
6150	1.40	52.65	0.07	0.07	0.02	0.01	0.00	0.26	0.05	0.04	0.02
X1020	5.2	33.5	0.50	0.48	0.31	0.08	0.03	0.52	0.25	0.13	0.02
X1020	3.8	30.8	0.41	0.32	0.13	0.07	0.00	0.56	0.19	0.05	0.02
X1020	3.7	29.9	0.42	0.37	0.18	0.04	0.00	0.51	0.21	0.07	0.04

and nitrogen, if the cyanate content of the carburizing bath has been permitted to drop to a low concentration. Table III shows the case analyses of three steels treated in baths of dissimilar cyanate contents.

The samples in Table III were obtained by heating in the bath and being permitted to cool slowly, surrounded by a small quantity of the bath in which they had been

heated in in order that they might be machinable.

The percentage of carbon shown in the table is the increment over the composition of the core. The point at which the percentage is shown was taken as follows: A cut 0.003 in. deep was taken on the radius of the bar and analyzed. It was assumed that the average would be at a point one half the depth of the cut and that the

analysis was the composition at that point.

The times and temperatures of the runs were as follows: S.A.E. 5150, 1 hr. at 1500 deg. F.; S.A.E. 6150, 30 min. at 1525 deg. F.; and S.A.E. X1020, 1 hr. at 1600 deg. F.

Ed Note:—Next week attention will be directed to effect of temperature and time, effect of steel being treated, activators, etc.

Notes on Aircraft Armor

FOR thicknesses of $\frac{3}{8}$ in. or over face-hardened armor plate, in general, is superior to homogeneous plate, according to Horace J. Alter, writing in the March-April issue of *Army Ordnance* magazine. Homogeneous plate, uniformly hard throughout, shows tendencies to throw buttons, spall and shatter when subjected to bursts of machine gun fire, due to the vibration which is set up in the internal molecules of the plate. Carburized plate, on the other hand, shows little tendency to crack, spall or throw buttons off the rear of the plate when hit by projectiles. For aircraft use, however, armor plate is not subjected to concentrated bursts of fire. The speed of the plane is relatively high, even when compared with bullet speed and, therefore, the dispersion of hits is such that no two shots are usually closer than 8 in. Hence homogeneous plate is safe and is preferred for aircraft protection since it can be formed to contours, has a simple heat treat-

ment, less manufacturing losses and in general is easier to fabricate.

Present combat ranges for airplanes are approximately 100 yd. or more. At that range, homogeneous or face hardened plate $\frac{1}{4}$ in. thick will stop complete penetration of a caliber 0.50 armor piercing bullet when the angle of obliquity, that is the angle between the flight path of the bullet and a line normal or perpendicular to the plate is 65 deg, or more. Armor plate $\frac{1}{2}$ in. thick will stop armor piercing 0.50 caliber bullets at 20 deg. to the normal. Good plate of either type shatters the projectile without appreciable signs of cracking or shattering itself. Most of the armor piercing cores break into small fragments upon striking the plate. By comparison, bullet proof glass 3 in. thick will stop 0.50 caliber bullets, and bullet proof glass 2 in. thick will stop penetration of 0.30 caliber bullets at normal impact.

In the design of armor plate for

aircraft use, advantage is taken of the fact that penetration under glancing impact is resisted by thinner plate than under normal impacts. For armor installed on the upper surface of the wing, for example, where the angles of impact are low, the plate can be thin, while for a section of plate at the rear of the fuselage, the plate will be thick because the preponderance of attacks are most likely to occur from the rear at angles normal or nearly normal to the plate. In other words, a weight comparison is made between thin plates installed at critical angles and thick plate installed at angles normal to the general line of fire. By centralizing vital mechanisms and personnel in specific areas, they may be protected by one piece of armor. Auxiliary equipment may also be installed to serve as additional protection and baffles for tumbling the bullet, thus allowing thinner plate to be installed. The effect of tumbling or turning the bullet is to increase the angle of impact.

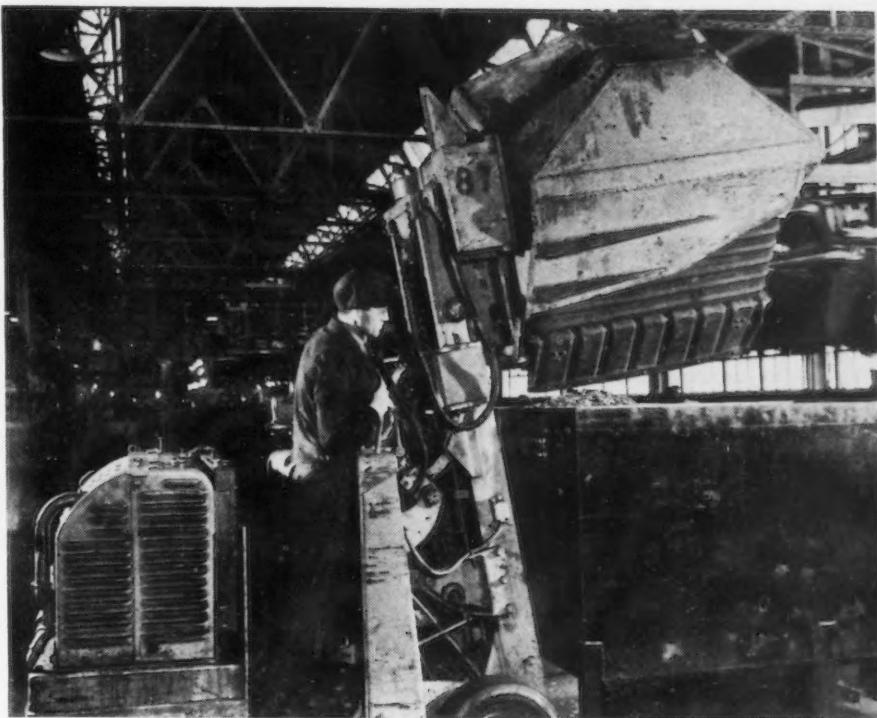
A NEW method for handling small parts in skid boxes has been developed by Plymouth at Detroit to reduce the number of skid boxes in use, reduce floor space taken up by partly filled boxes and greatly improve the steady flow of material to assembly plants. The method releases for other service a great many skid boxes which heretofore have been tied up with partial loads and eliminates the necessity of having several loaded or partly loaded skid boxes always at the point of use and frequently cluttering up aisleways, and work areas.

A revolving fork truck, specially designed for this work, was built for Plymouth by the Yale & Towne Mfg. Co. The truck is similar to those used in paper mills for unloading paper rolls by lifting the roll on the truck fork and then revolving the fork about an approximate horizontal axis.

The special design for this truck was worked out by Plymouth engineers and the Detroit representative of the manufacturer. In operation the fork of the truck is slid under the skid box platform in the usual manner. Above the box in this position is a welded plate hopper with flanges inside the hopper above the top edge of the box. The fork, loaded skid box and hopper are inverted by the operator to dump the load where desired. The hatch cover on the hopper opens automatically when the hopper is inverted, being actuated by a dog which hits the spring-loaded latch as the hopper nears the upside-down position.

After the truck had proved itself a successful tool in emptying partially filled skid boxes into other partially filled skid boxes, Plymouth engineers then installed large stock hoppers which would hold the contents of several skid boxes. These have an inclined flooring and a hopper-type feed which leads directly to the point where the assembly worker is stationed. This has resulted in a saving of additional floor space and further conservation of skid boxes. The practice now is to eliminate the parking of skid boxes near assembly points. The truck merely moves into position with the loaded box, dumps it into the hopper, then returns the skid box to the shipping platform or parts production for further use. Since the hopper holds the contents of several skid boxes, frequent refilling is unnecessary.

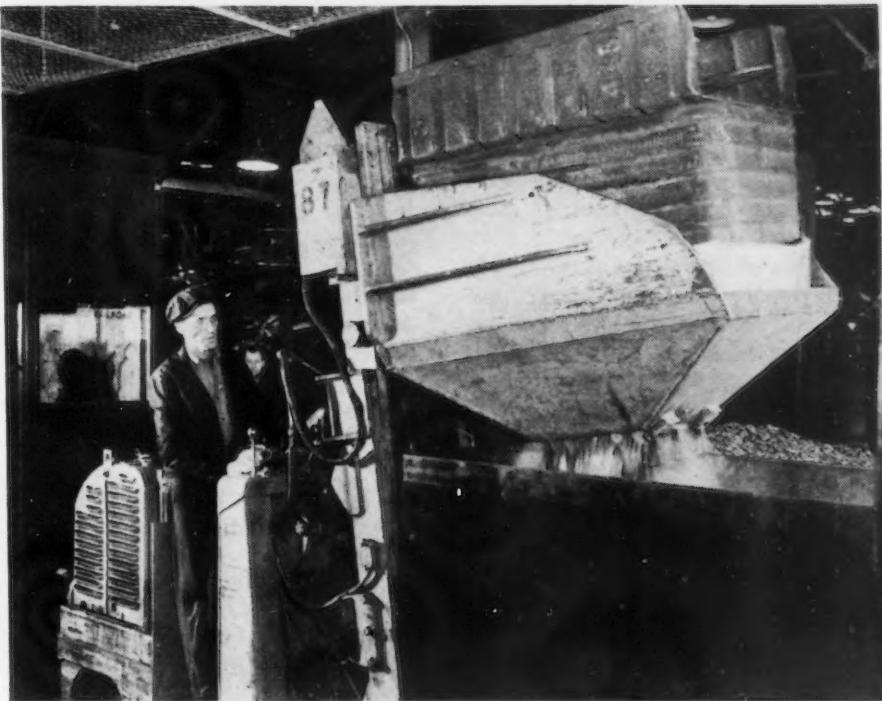
Plymouth Improves Handling of Small Parts



PICKING up skid box at the Plymouth plant with new Yale & Towne revolving fork truck.

• • •

POURING of small parts into the stock hopper designed by Plymouth.



41 Lessons in ARC WELDING

—Continuation of a series of lessons to enable beginners to master the fundamentals of bare and shielded-arc welding techniques.

LESSON No. 22: *Object is to study the deposition of beads of weld metal in the down hand position.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is steel plate $\frac{1}{4}$ in. or heavier, and $\frac{5}{32}$ in. diameter Crucible Weld "DH" welding electrodes.

INSTRUCTIONS: The student has already mastered the art of striking and holding the arc and of depositing beads of weld metal with bare type electrodes. It will not be necessary, therefore, to cover these elementary details again in this lesson.

The flux coating on a shielded-arc type electrode aids in striking and maintaining the arc and in making a more uniform weld deposit. The flux coating also produces a slag deposit on the weld which must be properly controlled if satisfactory beads are to be made.

When welding with a flux coated electrode in the down hand position care must be taken to adjust the welding current and speed of advance so that the slag covering on the weld does not run ahead of the arc. If the slag does run ahead of

the arc there is danger of obtaining poor fusion and an irregular shaped deposit. The beginner will have some difficulty in distinguishing between the slag and the molten metal. A little experience, however, will make it possible to distinguish between the two because of their slight difference in color and their action and flowing characteristics. The molten weld metal has a tendency to sweat onto the fused parent metal while molten slag tends to curl up at the edges in the manner of water on an oily surface.

The recommended practice for welding with flux coated electrodes is to point the electrode toward the deposit at an angle of about 15 deg., as shown in Fig. 41. The exact angle of the electrode may be varied under certain conditions but it should not be pointed away from the deposit unless arc blow or other conditions make such a procedure absolutely necessary.

The arc length recommended for down hand welding with flux coated electrodes is somewhat greater than that recommended for bare type electrodes. Too short an arc will cause the coating of the electrode to drag in the deposit and too long an arc will cause the metal to

be transferred in large drops and produce rough irregular beads and excessive spatter. With a little practice the beginner will soon be able to determine the proper arc length by the sound of the arc and the way the deposit forms.

When welding with flux coated electrode it will be noted that a deep crater is not formed. In order to fill or build up the crater it is necessary to pause for a short time over the crater and draw the arc out slowly until it breaks. Do not attempt to fill a crater by shortening the arc as discussed for bare type electrodes.

When restriking the arc to continue a bead or deposit, the slag should first be removed from the end of the previous deposit. This procedure is not always necessary but it is highly recommended for the beginner in order to insure complete fusion.

A wide bead may be made with flux coated electrodes by weaving. The maximum width of weave will depend upon the design of the joint being welded and the diameter and type of electrode. If the weave is too wide an irregular deposit may be obtained and trouble from the slag running ahead of the deposit

may be experienced. Recommended weaving procedures are similar to types A and C discussed in Lesson No. 4.

PROCEDURE: Set the polarity reversing switch on straight polarity, adjust the welding current to 150-160 amp. and place the plate to be welded flat on the welding table.

(1) Deposit string beads in all directions until smooth uniform beads may be made.

(2) Practice stopping and continuing beads deposited in all direc-

two diameters of electrodes and is intended to acquaint the student with the characteristics of flux coated electrodes when used in a groove. Special care must be taken to obtain fusion to the kerf surfaces and to prevent the slag from being entrapped in the weld. The slag should be removed from each layer before depositing the next layer.

A string bead will be found satisfactory for the first pass at the bottom of the joint. As the joint be-

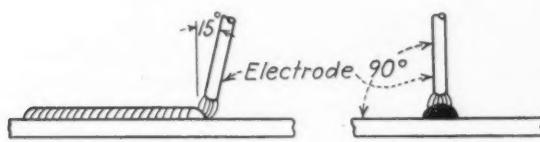


FIG. 41—Recommended practice for welding with flux coated electrodes.

tions. Chip out the starts to examine for complete fusion.

(3) Practice filling craters by slowly lengthening the arc. Try to fill a crater by shorting out the arc, as discussed in Lesson No. 2 for bare type electrodes, and note what happens.

(4) Practice depositing a bead by weaving. Try a small and a wide weave. Note the difference in the appearance of the deposit and the action of the slag when the weave becomes too wide.

(5) After the above exercises have been completed, make a test piece as shown in Fig. 42.

LESSON No. 23: *Object is to make a single vee butt weld between $\frac{3}{8}$ -in. plates by using flux coated electrodes. Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two $3 \times 6 \times \frac{3}{8}$ -in. steel plates, with a 30-deg. bevel along one end of each plate and $5/32$ -in. and $3/16$ -in. diameter Crucible Weld "DH" electrodes.*

INSTRUCTIONS: In order to reduce the amount of deposited metal required to fill a joint, it is common practice to use a joint design with a narrow included angle and increase the diameter of the electrode as the joint nears completion. Also, the metal deposited with flux coated electrodes is generally more fluid and molten for a longer length of time than metal deposited with bare type electrode, consequently joints with steeper kerf surfaces are often used.

This lesson employs the use of

comes wider it will be found necessary to weave the electrode. The width of weave should be adjusted so that each pass will be the full width of the joint. The proper weave will result in a slightly concave weld deposit without any undercut. If the weave is too narrow, entrapped slag and poor fusion will be present at the sides of the joint. If it is too wide, an excessive amount of the parent metal will be melted and undercut will result.

PROCEDURE: Set the polarity reversing switch on straight polarity and adjust the welding current for the diameter of electrode to be used ($5/32$ in. diameter—160 amp., $3/16$ in. diameter—190 amp.). Tack weld the plates together with a $1/8$ -in. free space, as shown in Fig. 43, and place them in a horizontal position on the welding table.

Weld the plates together by using three passes, as shown in Fig. 43. Clean the slag and spatter from each layer before depositing the next layer. Be careful to obtain complete fusion at all times. Inspect each layer for uniformity of

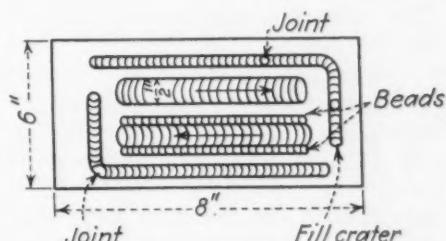


FIG. 42—Prepare this type of test piece for depositing horizontal beads with down hand type electrodes.

appearance and flaws. Try to improve the appearance and quality as the weld progresses.

After the joint is completed have the instructor inspect it for appearance. Following the instructor's inspection make a nicked groove on the top layer at the center of the weld and fracture the specimen. The exposed fracture should show sound uniform weld metal free from gas pockets, slag inclusions, poor fusion and incomplete penetration.

Repeat this exercise until a satisfactory butt weld of this design can be made.

LESSON No. 24: *Object is to make a single bevel butt weld between $\frac{1}{2}$ in. thick plates by using flux coated electrodes. Apparatus used is Westinghouse Flex Arc welding machines, chisel, hammer and wire scratch brush. Material used are two $3 \times 6 \times \frac{1}{2}$ in. steel plates with a 45 deg. bevel along one end of one plate and $3/16$ -in. and $1/4$ -in. diameter Crucible Weld "DH" electrodes.*

INSTRUCTIONS: The single bevel butt joint is often used in cases

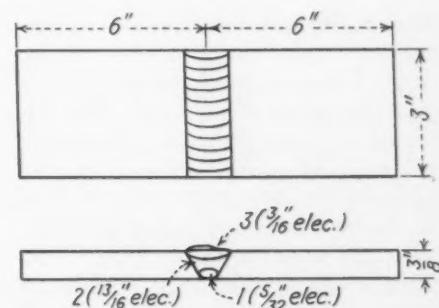


FIG. 43—Method to follow to make a single vee butt weld between $\frac{3}{8}$ -in. plates by using flux coated electrodes.

where it is desirable to bevel only one plate and in cases where it is desired to restrict the amount of deposited metal to a minimum without resorting to a double vee or "U" type of joint. The welding procedure used is similar to that outlined in Lesson 23 for single vee butt joints. The use of larger electrodes with consequently faster welding speeds is made possible in this lesson because thicker test plates are used.

When welding a single bevel joint it must be remembered that one of the kerf surfaces is at right-angles to the plate surface. Be-

cause of this vertical surface, special care must be taken by the welding operator to insure complete fusion and to prevent undercut.

PROCEDURE: Set the polarity reversing switch on straight polarity and adjust the welding current for the diameter of electrode to be used (3/16 in. diameter electrodes—185 amp., 1/4 in. diameter electrodes—285 amp.). Tack weld the plates together with a 1/8 in. free space at the bottom, as shown in Fig. 44, and place them in a hori-

zontal position on the welding table.

flux coated electrodes. Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 3 x 6 x 3/4-in. steel plates with a 30-deg. double vee on one end of each plate and 3/16 in. and 1/4 in. diameter Crucible Weld "DH" electrodes.

INSTRUCTIONS: The double bevel butt joint is generally employed on heavier plates (5/8 in. or above) in order to hold the amount of deposited metal to a minimum. In

Weld the plates together by using six passes, as shown in Fig. 45; the sequence of welding should be as shown by the numbers of the layers. Layers 1, 2 and 3 should be made with 3/16 in. diameter electrodes and layers 4, 5 and 6 should be made with 1/4 in. diameter electrodes. After depositing the first two layers, chip the reverse side of the joint to sound metal before depositing the third layer.

Be careful to obtain complete fusion at all times. Inspect each

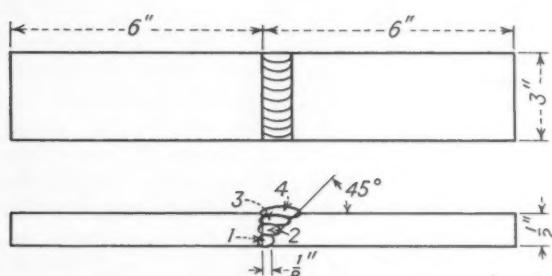


FIG. 44—Method to follow to make a single bevel butt weld between 1/2-in. plates by using flux coated electrodes.

zontal position on the welding table.

Weld the plates together by using four passes, as shown in Fig. 44. Passes 1 and 2 should be made with 3/16 in. diameter electrodes, and passes 3 and 4 should be made with 1/4 in. diameter electrodes. Clean the slag and spatter from each layer before depositing the next layer. Be careful to obtain complete fusion at all times. Inspect each layer for uniformity of appearance. Try to improve the appearance and quality as the weld progresses.

After the joint is completed, have the instructor inspect it for appearance. Following the instructor's inspection, make a nicked groove on the top layer at the center of the weld and fracture the specimen. The exposed fracture should show sound uniform weld metal free from gas pockets, slag inclusions, poor fusion and incomplete penetration.

Repeat this exercise until a satisfactory butt weld of this design can be made.

LESSON No. 25: *Object is to make a double vee butt weld between 3/4-in. thick plates by using*

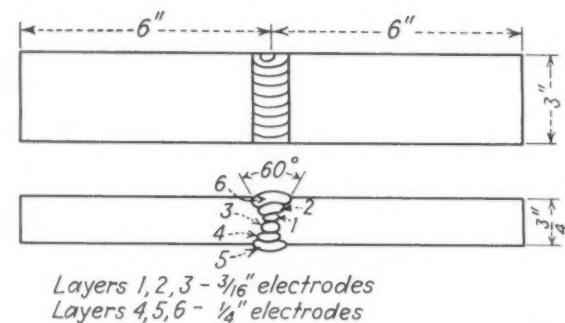
order to weld a double vee joint it is necessary that both sides of the plate be accessible. This requirement often limits the use of this type of joint.

The welding procedure used is similar to that outlined in the two previous lessons. After depositing the weld on one side of the joint it is essential that the back side be chipped out to sound metal before depositing metal on that side. If the root of the weld is not chipped out, inclusions and poor fusion will be obtained.

In order to prevent the plates from warping excessively it is often desirable to deposit metal on each side of the joint alternately rather than to complete one side before starting to weld on the second side. This type of procedure will be used in this lesson.

PROCEDURE: Set the polarity reversing switch on straight polarity and adjust the welding current for the diameter of electrode to be used (3/16 in. diameter electrodes—185 amp., 1/4 in. diameter electrodes—285 amp.). Tack weld the plates together with a 1/8-in. free space, as shown in Fig. 45, and place them in a horizontal position on the welding table.

FIG. 45—Method to follow to make a double vee butt weld between 3/4-in. plates by using flux coated electrodes.



Layers 1, 2, 3 - 3/16" electrodes
Layers 4, 5, 6 - 1/4" electrodes

layer for uniformity of appearance. Remove all slag and spatter from each layer before depositing the next.

After the joint is completed, have the instructor inspect it for appearance. Following the instructor's inspection, make a nicked groove on the top layer at the center of the weld and fracture the specimen. The exposed fracture should show sound uniform metal free from gas pockets, slag inclusions, poor fusion and incomplete penetration.

Repeat this exercise until a satisfactory butt weld of this design can be made.

LESSON No. 26: *Object is to make a 3/8-in. fillet weld on a tee joint with flux coated electrodes by positioning the joint to simulate a butt weld.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 6 x 8 x 1/2-in. steel plates, and 3/16 in. diameter Crucible Weld "DH" electrodes.

INSTRUCTIONS: Electrodes designed especially for down hand welding generally have a very fluid

slag which makes it difficult to deposit the weld metal so that one side will fuse to a vertical surface. A horizontal fillet weld has one leg in the vertical plane and if a down hand type of electrode is used to make it, considerable trouble will probably be experienced from undercut on the vertical surface, excessive roll, improper shape of the weld and slag pits on the weld surface. As a result, if a fillet weld is to be made with down hand type electrodes it is recommended that

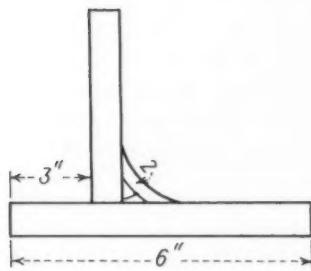
so that the weld will not be larger than $\frac{3}{8}$ in.

The finished weld should be slightly concave and be smooth and entirely free from undercut at the edges. Fracture the finished weld and inspect for soundness and complete penetration. Repeat this exercise until a satisfactory weld can be made.

LESSON No. 27: Object is to study the deposition of beads of weld metal in the down hand

ripples. A little practice with this type of electrode will make it easily possible to distinguish between the molten metal and slag, an important factor in controlling the deposited metal and producing high quality welds in the vertical and overhead positions.

The fact that a position type flux coated electrode does not produce a very fluid deposit makes it impractical to weave as wide as is the case with down hand type electrodes. String beads are generally



LEFT

FIG. 46—Method of making a $\frac{3}{8}$ -in. fillet weld on a tee joint with flux coated electrodes by positioning the joint to simulate a butt weld.

• • •

RIGHT

FIG. 47—Test plate to study the deposition of beads of weld metal in the down hand position.

the parts be positioned at an angle of 45 deg., thereby simulating the welding conditions of a butt weld. The welding procedure in such a case is identical to that discussed for down hand type butt welds.

PROCEDURE: Set the polarity reversing switch on straight polarity and adjust the welding current to 185 amp. Tack weld two plates together, as shown in Fig. 46, and position them on the welding table at an angle of 45 deg.

Weld the plates together with a $\frac{3}{8}$ -in. fillet weld by using two layers, as shown in Fig. 46. Make the first pass at a relatively rapid rate of speed so that not more than a $\frac{1}{4}$ -in. fillet will be produced. Deposit the second layer by weaving from side to side to insure complete fusion. Adjust the rate of advance

position. Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is steel plate $\frac{1}{4}$ in. or heavier, and $\frac{5}{32}$ in. diameter Crucible Weld "AP" welding electrodes.

INSTRUCTIONS: Flux coated electrodes designed for welding in all positions have somewhat different characteristics than those designed for down hand welding. The proper length of arc to hold is usually shorter than it is for down hand electrodes. There is also less welding slag and this slag is less fluid and solidifies more rapidly. These characteristics of the welding slag make the operation of this type of electrode somewhat similar to that of bare type electrodes and consequently produce welds with surface

used in all cases except when welding on vertical surfaces.

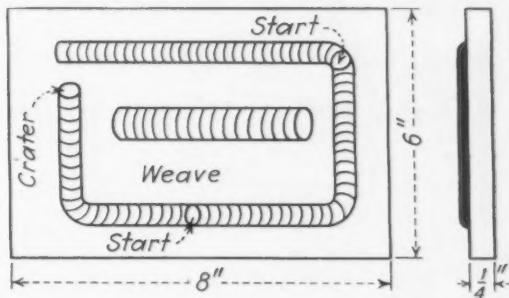
PROCEDURE: Set the polarity reversing switch on reverse polarity, adjust the welding current to about 160 amp. and place the practice plate flat on the welding table.

(1) Deposit string beads in all directions. Take special care to have the rate of advance uniform as this is important in making smooth uniform beads.

(2) Practice stopping and starting the weld. Try to make a smooth junction at the starts.

(4) Practice a small weave and note how the deposited metal flows and quickly solidifies.

(4) After reasonable skill has been obtained in depositing beads make a test plate as shown in Fig. 47.



High Speed Steel

—Continuation of data presented last week on recent English production research. Herein, attention is directed to high speed steel tool failures and metallurgical aspects of machining.

By H. W. Pinder

Metallurgist, William Jessop & Sons, Ltd.
Sheffield, England

HIGH SPEED STEEL TOOL FAILURES: The failures of high speed steel tools either in the hardening operations or in service must necessarily lead to very substantial losses in time and output. It is, therefore, of the utmost importance that the fundamental causes of such failures are fully understood, because modifications in a heat treatment cycle may suggest themselves or the design of tool be changed on the results of an investigation into premature failure.

In the majority of instances, therefore, no little care is necessary in the investigation of tool steel failures. Nor is this surprising when it is realized that many post mortem examinations are carried out on tools at the failure of which there was no witness to say whether there had been a measure of foul play, or lack of normal precautions in handling the tool. In fact the evidence concerning failure is often second or third hand when received by the investigator, and even if originally reasonably complete, some vital link in the account is often unwittingly omitted, or the account of the conditions existing at the time of failure

written or described in a distorted fashion.

For example a tool does not crack during hardening because the path of the crack is found to link up with an inclusion of a rather rare variety, or a minor carbide segregate well removed from the origin of the defect. When such reasons to account for failure are given, they very often serve to indicate that the investigator has failed to find any really positive evidence which would satisfactorily explain the formation of the crack; consequently any slightly unusual characteristic in the material is seized upon to explain the failure.

HIGH SPEED TOOL FAILURES: In the following brief review it is useful to distinguish between the following cases classified broadly as follows:

- (1) Inherent steel defects leading to subsequent failure.
- (2) Heat treatment failures (and failures arising therefrom).
- (3) Failures initiated during finishing the tools for service, and from abnormal conditions during service.

Examples of failures under the

first heading are usually found where considerable machining has been done on the surface of a bar, or where in the case of a cutter or hob made from a blank, the central portion has been bored out. Should defects be brought to the surface of a tool by a machining operation and they persist after local machining to very near the finished size, the tool is scrapped. The danger arises, however, from the fact that after visual inspection the defects often appear to have been cleared, where in point of fact a trace of the trouble remains.

Such deception is more likely to occur in bored holes, but where there is doubt, magnetic crack detection will invariably give a clear answer.

On the other hand, an elongated segregate or internal crack may just come to the surface of a tool after machining but prior to heat treatment, and in these cases may pass unnoticed. When either of the above defects occur it might be thought that such defects would invariably open up in heat treatment, but this is not always the case, especially when the heat treatment is under strict control. Two examples illustrating the above possibilities from a number which have come to the author's notice are given below. The first relates to two very complex cutters which had bored and keyed central holes 7 in. long, and which on being put into service failed prematurely. An examination showed that both tools had failed similarly and that fractures had progressed from an original defect in the bore. The cutters had been salt bath treated and the original surfaces of the defects were almost perfectly preserved. These defects which had a smooth appearance resulting from rubbing during forging were almost certainly the remains of some slight unsoundness which had extended during hot working, and had not been completely removed during machining.

The other example concerns a broach in which a defect, was apparently partially uncovered by machining, and which was passed forward as sound for heat treatment. The broach was successfully hardened and tempered, but final grinding established the presence of an extensive seam which persisted for a length of approximately 3½ in. After breaking the broach

across the defect, one portion was used for exposing the surfaces of the seam, which proved to be bright and crystalline. From the other half a micro section was prepared which after polishing and etching showed that the seam had arisen from the elongation of a segregate. In both the above examples, magnetic inspection methods would have revealed the presence of the defects before heat treatment.

Dealing with failures classified under (2), it should be noted that heat treatment troubles are usually most frequent where the plant is antiquated, or the fundamental principles of heat treatment are not fully understood. In well organized shops minor defects present in tools often persist during heat treatment without extension, which indicates that under controlled conditions heat treatment failures should be negligible. Nevertheless, all too numerous cases of heat treatment failures continue to occur. Sometimes the troubles are traceable to decarburization resulting in a soft skin, and at other times the softness is due to overtempering. In the one case the atmosphere was incorrect for a given hardening temperature, and in the other case the temperature control was at fault.

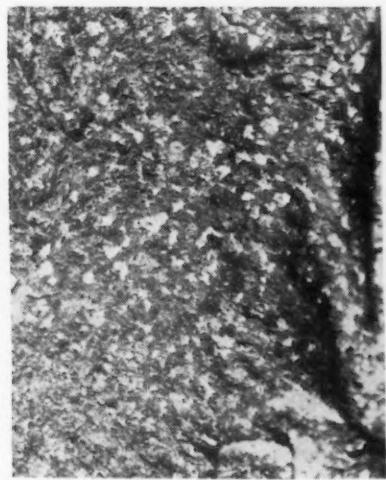
On the other hand, numbers of cracked tools often arise as a result of ignoring normal precautions between hardening and tempering. This is proved in the absence of evidence disclosing inherent steel

troubles, or an overheated structure when the tools have been tempered in an air tempering bath, as blueing invariably develops on the surfaces of defects. If tempering is carried out in a salt bath a trace of salt is invariably found on the exposed surfaces of the defect. Such cracks are due to a prolonged delay between hardening and tempering or alternatively, as a result of putting tools having considerable changes in section into the tempering bath when the latter is too hot. After hardening, tools should be tempered immediately they are hand warm (for example 104 deg. F.). They should be placed in a tempering bath at a temperature between 212 deg. F. and 302 deg. F. and allowed to equalize, and then raised steadily to the tempering temperature. Raising the temperature too quickly will crack very intricately shaped tools having unequal sections, because at 842 deg. F. high speed steel expands suddenly. Thus, a quick rise of the tempering temperature causes the outside zones to expand suddenly while the inside portions of the tool are rigid.

Further examples under this heading are provided in connection with snipped and fractured tools. In many instances there is always a tendency to blame the slightest evidence of heterogeneity in the steel for such failures. It has been the author's experience that such failures are almost invariably bound up with the condition of the

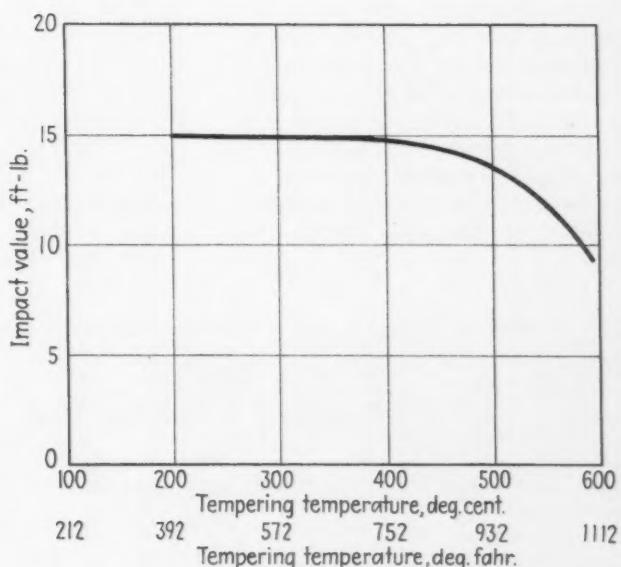
tool after heat treatment, or abnormal conditions under which the tools functioned. In a number of instances this type of failure has been found to be associated with a finely crystalline dry type of fracture and a high hardness, both of which pointed to an unnecessarily long soak at the hardening temperature, followed by a fully effective tempering. This treatment had resulted in putting the tools into a brittle condition. Occasionally this type of failure is associated with the "fish scale" fracture which persists as the result of a double hardening treatment, or as the result of a high finishing forging or rolling temperature on the blank or bar, from which the tool was made. Fig. 6 is a photograph showing this type of fracture. Should such a grain persist in a finished tool, failure will invariably occur by shock overload stresses encountered in service.

Under classification (3) failures initiated during finishing a tool for service are usually associated with cracks which developed as a result of faulty grinding, slight machining errors, such as the retention of unnecessarily sharp changes in section, or the weakening of the cutting edge by employing large rake or clearance angles. Failures connected with grinding cracks have been more frequent than would be expected in view of the advances made in this field, and it would appear that the development of such cracks results more often



LEFT
FIG. 6—Tool failure associated with the "fish scale" fracture which persists as the result of a double hardening treatment, or as the result of a high finishing forging or rolling temperature.

RIGHT
FIG. 7—Change of impact value over a tempering range of 392 deg. to 1112 deg. F.



from the demand to get a job through in the minimum time, rather than from an ignorance of the precautions which should be taken. Regarding slight machining errors or improper design which result in the persistence of sharp changes in section, or undercut radii, such defects often lead to failure by the initiation of fatigue flaws, which in comparatively brittle materials extend rapidly. Unnecessarily large top rake angles often cause fracture by shear across the end of a turning tool, while large clearance angles reduce the strength of the cutting edge so that it is more readily overheated. It should not be taken for granted, therefore, that all tool steel failures are related to the quality of the steel or its heat treatment. Almost as many tools fail in service as a result of faulty design or abuse, as do from inherent steel defects or inefficient heat treatment.

Metallurgical Aspects of Machining

In order to produce the most efficient cutting tools it is necessary to have a clear idea of the successive stages which govern the removal of metal by machining.

The fundamental principles of machining are the same whether the tools are milling, turning, or hobbing; therefore the operation of turning may be taken as an example. When a turning tool is first engaged with the work, high compressive stresses develop between the cutting edge of the tool and the work, which first result in the metal flowing over the tool face. As the work moves against the tool, however, the peak compressive stresses fall slightly because rupture occurs at the surface of the work by shear, but simultaneously with the fall in the compressive stresses the wear effect of the chip so formed becomes apparent as it escapes over the built up edge on the tool or the tool face.

According to Ernst there are three main types of chip, (1) the discontinuous chip, (2) the continuous type of chip, and (3) the continuous type of chip forming a built-up edge adjacent to the tool face.

(3) Is by far the most damaging, and is more likely to form when machining tough steels.

(2) Is the ideal chip giving a good finish for a maximum amount of wear and low power consumption.

(1) Produces effects which compromise between (2) and (3).

The above facts, therefore, suggest that the following properties are desirable in high speed steel cutting tools.

A high hardness with a measure of toughness at the cutting temperature; as good a heat conductivity as possible and a high resistance to wear at the working temperature.

A number of typical tool steels shown in Table I possess these properties to a high degree, but the full benefits are only likely to be derived from such steels as cutting tools if they have received the optimum heat treatment. It has been established that the highest cutting efficiency is obtained only when a tool has been hardened from the highest temperature above which partial fusion and excessive grain growth would occur, and if subsequently tempered so as to develop the maximum secondary hardness. Invariably a single tempering treatment is insufficient to develop the maximum secondary hardness even in a straight 18 per cent tungsten steel, and in many cases, such as the cobalt steels, as many as two or three distinct tempering treatments are necessary. This is due to a change in the properties of high speed steel during cooling after tempering. Such changes have been detected by magnetic analysis, and although this effect has been investigated by the

author, he has not confirmed that it is purely a further transformation from austenite to martensite as suggested by some investigators. No doubt this change has an important bearing on the cutting properties of high speed steel, and only by a very highly controlled cooling procedure could the transformation be fully effected by a single tempering treatment. It is thus more convenient to temper a number of times in order to complete the transformation. However, it is not always advisable to use a tool in this condition, because after having been heat treated to give such a hardness it is probably in a comparatively brittle condition. Thus, when a tool has to be used under conditions where a higher degree of shock resistance than normal is desirable, such as for example in heavy intermittent cutting, it will be necessary to heat treat so that a finer grain size is obtained, and temper in the range which will give the optimum toughness. Fig. 7 shows the change of impact value over a tempering range of 392 deg. to 1112 deg. F., from which it can be seen that tempering at 842 deg. F. will produce a tougher steel.

Until recently, that is before the advent of controlled atmosphere furnaces, it was not easy to control the grain size of hardened high speed steel tools. This was due in some measure to the self heating effect of the atmosphere containing excessive quantities of CO_2 gas, which surrounded the tool at the hardening temperatures. Now, when the composition of the atmosphere can be predetermined, the grain size of the tool can be much more easily controlled. In addition, accurate pyrometric control of the heat treatment operations has become more firmly established.

It is apparent from the foregoing remarks, therefore, that the properties obtainable in high speed steel tools can be usefully varied according to the type of material being machined, the type of machining operation being carried out, and the conditions under which the machine tool functions. For example, play in the bearing or abnormal vibration might result in the premature failure of a cutting tool. A consideration of these and similarly related factors, therefore, will largely determine what properties are to be developed when heat treating cutting tools.

TABLE I
Analysis of Typical Tool Steels

	C	Mn	Si	W	Cr	V	Mo	Co
Tungsten 18/4/1 type	0.78	0.30	0.25	18.5	4.2	1.1	0.5	...
Tungsten-cobalt type	0.79	0.30	0.25	19.0	4.5	1.4	...	5.0 to 18.0
Molybdenum-tungsten type	0.75	0.30	0.25	2.5	4.2	0.9	8.5	...
Molybdenum-tungsten-cobalt type	0.75	0.30	0.25	2.5	4.2	1.0	8.5	5.0
Molybdenum-vanadium type	1.20	0.37	0.35	2.5	...	1.75 to 2.5	8.5	...

Heat Treating Aircraft Tubing

IN the modern airplane, seamless steel tubing is used extensively for such vital parts as motor mounts, the fuselage, struts, piston pins, push rods, oil lines, and certain types of shafts. Considering the merciless strain of combined tension, compression, and torsion exerted on the tubing of such parts as the motor mounts when pulling out of a power dive, it is evident that nothing can be left to chance in the manufacture of aircraft tubing.

Seamless tubing for such applications has been standardized, with S.A.E. X4130 (chrome - molybdenum) being one of the most popular steels used for aircraft tubing. This steel is higher in chromium and lower in manganese than S.A.E. 4130. It is characterized by its resistance to impact, fatigue and abrasion. It has good machinability and is readily welded by either gas or electric methods.

Since it hardens readily by cold working, process anneals are

By H. R. LEWIS
Chief Metallurgist, Ohio Seamless
Tube Co., Shelby, Ohio

annealing was installed four years ago and has been in almost constant use since then.

The high quality finish of tubing annealed in a controlled atmosphere furnace, as compared with the old method of annealing and subsequent pickling, prompted the company to consider a furnace capable of bright normalizing as well as bright annealing. It was desired to bright normalize and at the same time retain all the physical properties derived from cooling in still air.

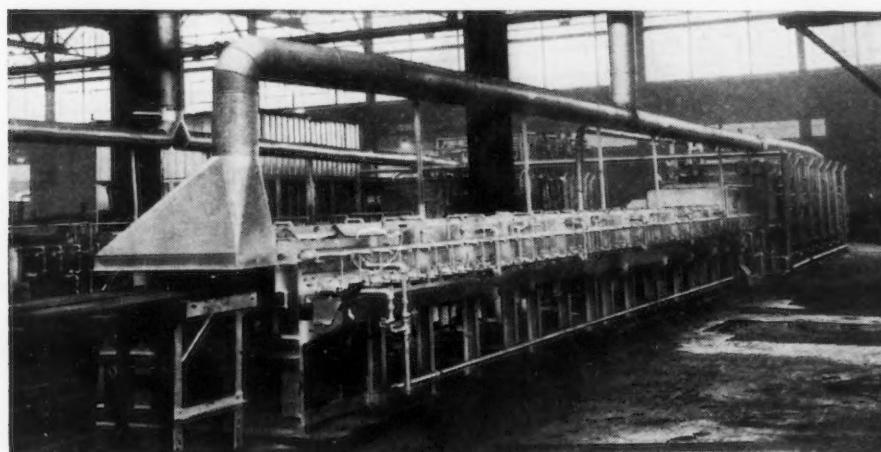
Since the normalizing operation is carried out at as high a temperature as 1700 deg. F., approximately 300 deg. higher than the annealing temperature, the method of cooling

without an excessively long cooling chamber presented somewhat of a problem. Then, too, the question of alloy life and decarburization at the more elevated temperature had to be considered.

The furnace is of the roller hearth type and is heated by means of gas-fired radiant tubes mounted both above and below the conveyor in the heating zone. The internal dimensions of the heating chamber are approximately 3 ft. 6 in. wide by 27 ft. long. The overall length of the unit including the heating chamber, cooling chamber, charge and discharge tables, is approximately 145 ft.

The rated capacity of the furnace when annealing and operating continuously is 3200 lb. per hr. of 2-in. o.d. tubes having a wall thickness of 0.125 in. heated from cold to a temperature of 1400 deg. F. with a temperature differential of 10 deg. F. plus or minus. Operating at this capacity and annealing this size tubing, the total heating cycle is 72 min., of which 20 min. is heating and 52 min. cooling. For process annealing where the temperature differential is not so important, the furnace has a capacity of 4600 lb. per hr. for the above size tubes. The production rate and cycle for other sized tubing varies with the diameter and wall thickness.

The use of radiant tubes for heating makes possible a simplified application of a controlled atmosphere. The atmosphere gas is produced in a unit separate from the furnace by partial combustion and subsequent refining of natural gas. The atmosphere gas has an analysis of approximately 74 per cent N₂, 9.6 per cent H₂, 8.7 per cent CO, 5.8 per cent CO₂, and 1.9 per cent CH₄.



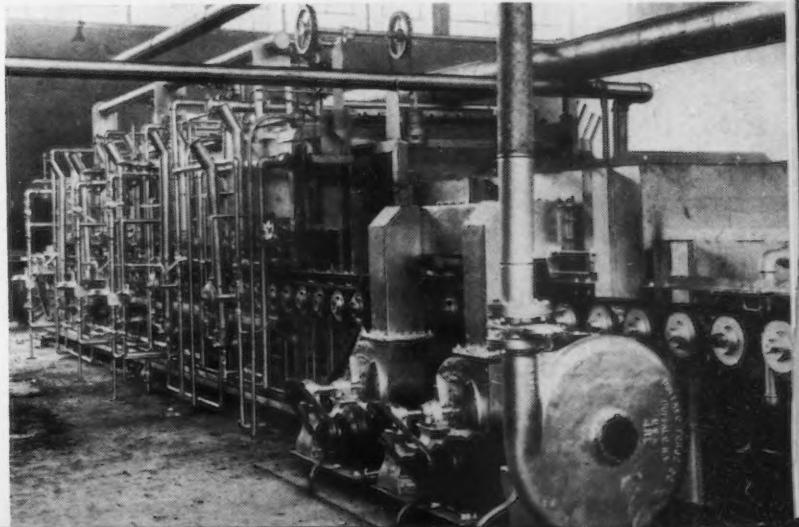
DISCHARGE end showing cooling section and the water cooled roller bearings.

usually required after each draw. Depending on the application, the finished heat treatment is usually an anneal or normalize.

The Ohio Seamless Tube Co., Shelby, Ohio, recently installed a second and third Surface Combustion continuous controlled atmosphere for annealing and normalizing seamless aircraft tubing. The first furnace of this type for bright

• • •

PARTIAL view showing fast cooling section used for normalizing. Note the two recirculating fans connected to this section.



Three-Phase Process for

Up until the past year or so the spot welding of aluminum has been difficult and the welds produced have been unsatisfactory. Aluminum has little resistance to the passage of current and thus requires a large amount of current to generate sufficient heat to obtain a weld. Furthermore its plastic range is extremely short and hence the current must be "on" for a very short interval. During this interval, welding pressure must be accurately controlled and carefully balanced with the amount of current applied in order that excessive surface indentation does not occur.

Of the various complications, the problem of supplying sufficient current to the work is probably the greatest and has been approached in several ways. Two new solu-

tions of the problem were described in THE IRON AGE last year. The Sciaky stored energy system was described in the March 21, 1940 issue, p. 33. With it a choke coil or transformer primary is charged with d.c. and a high secondary current is set up when the primary circuit is interrupted and the flux rapidly decays to zero in the core. A month later in the April 18 issue, p. 42, a description was given of the Taylor-Winfield Hi-Wave welder for aluminum alloys. The latter is another stored energy system in which a bank of capacitors or condensers is charged with d.c. and the capacitors are discharged through a conventional resistance welding transformer. In both machines, special means are provided for controlling the pressure on the

tips during the welding cycle.

Now, a third and entirely different principle of operation has been announced by the Progressive Welder Co., 3050 E. Outer Drive, Detroit. The principle on which the apparatus illustrated in Fig. 1 operates is based on the use of all three phases of three-phase a.c., the required wave form for the weld being developed in such a manner as to permit precise control of welding current. Welding speeds are said to be directly in line with those customarily obtained in the spot welding of sheet steel and are limited only by the speeds at which the work can be moved between welds. Welds are said to have a striking uniformity and to be apparently entirely free of cracks and blowholes. Fig. 2 shows a macrophotograph of a typical specimen weld, illustrating the freedom from porosity.

The flexibility of equipment permits the welding of aluminum sec-

FIG. 1—Progressive Welder has introduced an aluminum spot welder which employs all three phases of three-phase current to gain required high welding currents and to produce uniform welds having twice the strength of government requirements. Timer control, which is 100 per cent electrical, is mounted on panel at left.

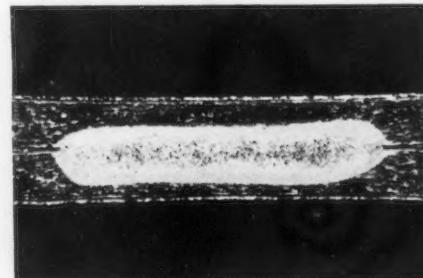
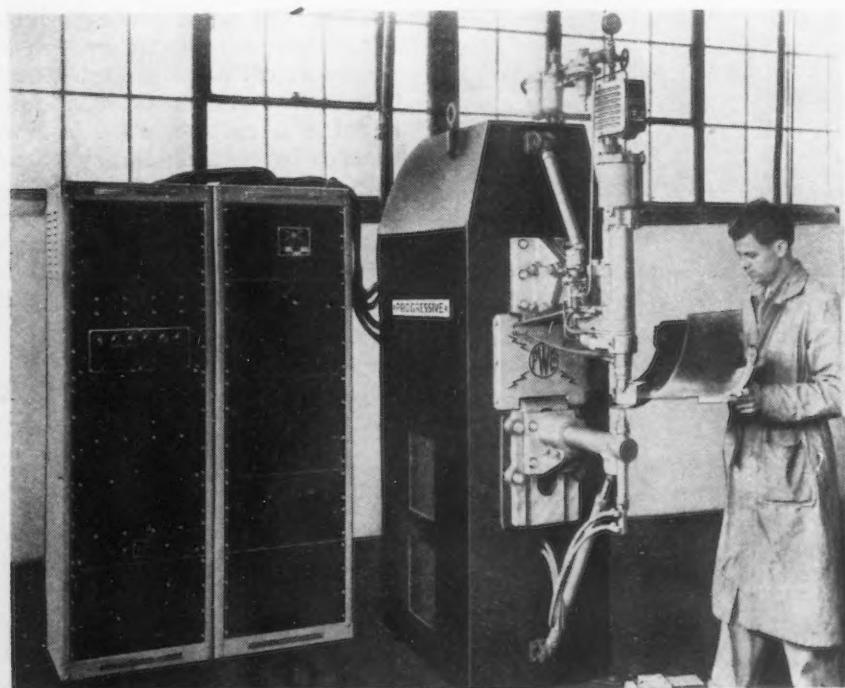


FIG. 2—Macrophotograph of typical specimen weld shows satisfactory grain structure free from cracks, blow-holes, etc.

tions totaling $\frac{1}{4}$ in. in thickness down to the thinnest weldable sheet on the same machine, as shown in Fig. 3. It is possible, for instance, to spot weld seven pieces of 0.032 in. section 24 S.T. aluminum sheet with a 150 kva. three-phase welder.

Shear-strength tests made on 50 samples selected out of 100 run un-

Welding Aluminum . . .

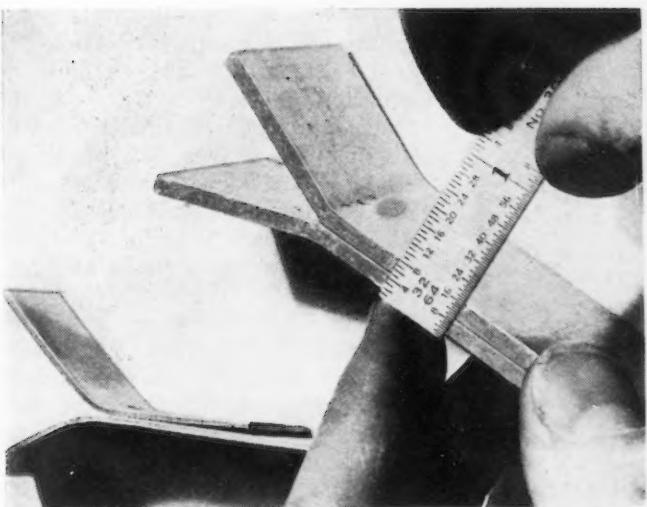


FIG. 3—Range of capacity of the "Progressive" aluminum welding machine is indicated by these two samples welded by the same machine within a few moments of each other: Two pieces of $1/8$ in., and two sections of 0.032 in., 24 S.T. aluminum alloy.

• • •

der operating conditions which simulate actual conditions show a better than 100 per cent margin over government requirements. They show weld strength variations to be not over 5 per cent from the average.

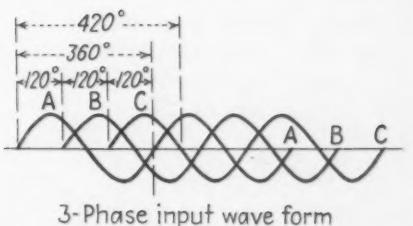
Essentially, the new Progressive three-phase short wave process consists of passing the current through a special transformer with one set of the three coils reversed or inverted so as to give a 60-deg. spacing between wave forms, and then rectifying the resulting current, Fig. 4, through three ignitron tubes which also act as contactors, fired through an electronic timer panel. The current then passes through the welding transformer, amplifying the current in the usual way. The resulting secondary current wave form is ideal for the welding of aluminum, Fig. 5. The current rises to its maximum almost instantly, stays at this value for practically the entire duration of the weld then drops to zero in an extremely short period of time.

For the various sequences of the welding operation, a timer panel houses the ignitron tubes and provides completely automatic operation for an unusually wide range

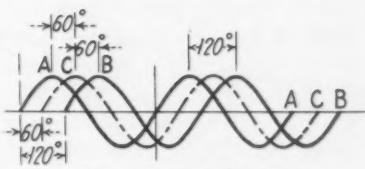
of aluminum welding operations. With it, weld time can be anywhere from the maximum, $1/72$ of a second, down to $1/360$. Thus, the adjustment provides for correct welding time for any aluminum spot welding job from the thinnest weldable sheet up to two $1/8 \times 1/8$ in. sections and is obtained by simple manipulation of but two control knobs on the panel.

The complete equipment, mechanically, is almost identical with standard Progressive pedestal-type welding equipment. Welding pressures are obtained through a direct air-operated pressure cylinder which is mounted on the upper arm and actuates the upper welding electrode, and are so handled as to provide a follow-through. To assure a closer and more positive connection between welding transformer and work, an air-operated secondary shunt clamp grips the upper electrode after the work is under welding pressure.

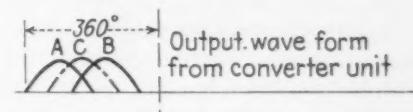
Automatic repeat timing, which allows sufficient interval between welds to reposition the work, permits making any number of welds in succession automatically without reclosing the pilot device for each weld.



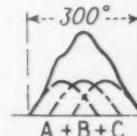
3-Phase input wave form



Output wave form from inverter unit



Output wave form from converter unit



Theoretical wave form of welding current

FIG. 4—Schematic diagram indicating how three-phase alternating current is converted to produce sufficient current for welding aluminum by means of an inverter without complicated or costly equipment. Resulting pulsating current has a time cycle of 300 deg. instead of the original 360 deg.

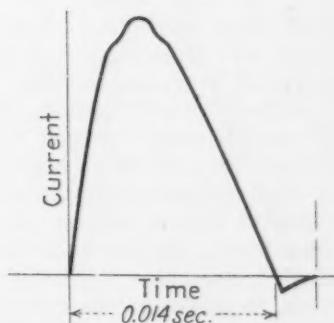


FIG. 5—Best welding current wave for aluminum alloy sheet is steep-walled with sustained rather than sharply peaked form during the weld. This drawing is from oscillograph recording made during an actual weld.

Tool Engineers Stage Suc

THE most successful tool show in its history was staged by the American Society for Tool Engineers last week in Detroit. Between 35,000 and 40,000 engineers and executives from all over the country poured into Convention Hall from Tuesday, March 25 until the doors were closed on Saturday evening, March 29. Despite the press of production duties, a vast host of key men in the aircraft industry and other defense contractors were present, and it was evident that many of them took back new production ideas gleaned from the displays of tools and equipment put on by the 250 exhibitors.

It would be difficult in a brief review of this kind to discuss even a fraction of the displays, which were listed in the March 20 issue, but without question the booth that attracted most attention was the one demonstrating the drilling of hardened tool steel with a drill bit of unconventional design and of secret composition. The work was demonstrated in an ordinary drill press and it was no secret that the drill first tempered the material by the creation of frictional heat and then went through. In this way a material of 56 C Rockwell hardness could penetrate tool steel Rockwelling at 60-62 C. The tools were shown by the Black Drill Co. of Cleveland.

The influence of the shortage of certain strategic materials was seen in a few displays. Hardinge Brothers exhibited its line of Sjogren Speed collet chucks operated by a large handwheel now made of cellulose acetate (Tenite), in place of aluminum. With a shortage of tungsten looming up, Gorham Tool Co. exhibited its M-40 super molybdenum forged high speed steel, containing no tungsten, 8 per cent molybdenum, 8 cobalt, 4 chromium, 1½ vanadium and ½ per cent boron. It was freely predicted that because of demand for tungsten in bullet cores, only the cemented carbide manufacturers would get tungsten in the near future.

A number of educational displays were included such as a complete line of Allison liquid cooled aircraft engines, Hamilton Standard pro-



FRANK W. CURTIS

Newly elected president of the American Society of Tool Engineers.

pellers, the Ford "Blitz buggies," Dodge reconnaissance cars and Packard marine engines for the "Mosquito" fleet. Many of the tool and machine displays were also tied in directly with defense production.

New Officers Installed

Frank W. Curtis, chief engineer, milling machines, Van Norman Machine Tool Co., and chairman of the Springfield (Mass.) chapter, was installed as new president of the society at the annual dinner on Friday night. Other officers of the society elected by the board of directors the day before and also installed were: first vice-president, Otto W. Winter, factory manager, Columbus McKinnon Chain Corp., Tonawanda, N. Y.; second vice-president, Ray H. Morris, resident vice-president, Hardinge Brothers, Inc., West Hartford; secretary, Clyde W. Hause, sales engineer, Gorham Tool Co., Detroit, and treasurer, Frank R. Crone, chief tool designer, Lincoln Motor Division, Ford Motor Co. Mr. Hause also received on behalf of the Detroit chapter of which he was chairman,

the national membership cup for the largest gain in membership. The No. 1 chapter of the society had added over 300 members in the past year. Ford R. Lamb was re-elected executive secretary.

Mr. Curtis, the new president, is widely known in his field. He is the author of a number of books on tool engineering subjects and has contributed many articles to the trade and technical press. He was at one time Western editor of *American Machinist*, and prior to his present position held the following positions in industry: Chief engineer, carbide division of P. R. Mallory & Co.; research engineer, Kearny & Trecker Corp., and chief engineer, Firthite division, Firth-Sterling Steel Co. He organized the Springfield chapter last April and in less than a year built up the membership from 50 to 210 members.

A. H. d'Arcambal, who presided as retiring president, indicated that during his administration the society had increased its membership as a whole 62½ per cent, growing from 4300 members on March, 1940, to 6900 members now. Nine new chapters were established during the year, making 40 in all extending from coast to coast and with one chapter in Canada. Mr. d'Arcambal predicted that the society would have 10,000 by the time of the next annual meeting, which is to be held in St. Louis. The semi-annual meeting is to be held in Toronto in October.

Plant Protection

Guard systems in industrial plants carrying on defense work are extremely lax, according to L. R. Pennington, assistant to J. Edgar Hoover, Federal Bureau of Investigation, who was the principal speaker at the banquet. Mr. Pennington cited examples of how FBI men had walked into some plants unchallenged and spoken with workers and foremen on precision operations and how some plants employed superannuated men at the gates. He cautioned that only men with intelligence and loyalty whose backgrounds had been investigated should be employed as plant guards. To prevent

cessful Show and Meeting

employees from wandering from their regular posts, Mr. Pennington advocated the use of distinctive badges of different colors to distinguish men from the office, engineering department, and shop. The speaker also disclosed many loopholes in the safeguarding of confidential Army and Navy blueprints and suggested the use of a checking or chargeout system for handling of all such prints.

Reports on espionage, sabotage and subversive activities have greatly increased in the last few years, the speaker pointed out, citing an average of 35 cases a year up to 1938, 250 in 1938, 1650 in 1939 and over 16,000 up to July, 1940. While every possible lead has been run down, few cases of sabotage have been found and most of these have been detected before any real damage was done to products or machinery. Insurance statistics show that considering the rapid increase in industrial activity and the number of new plants constructed, there has not been an inordinately rapid increase in the number of fires in factories or of explosions. The most serious explosion that occurred last year in a smokeless powder plant was definitely not due to sabotage but due to lack of proper safeguards for an aggravated industrial hazard.

At present, Mr. Pennington said, 1300 of the most important defense plants have been surveyed by the FBI for proper safeguards, but eventually over 12,000 plants will have to be covered.

Production of Naval Ordnance

Cost estimates on production of components in Navy ordnance factories are remarkably accurate, according to Joseph A. Davies, chief planner and estimator, Naval Gun Factory, Washington, despite the fact that no time studies or stop watches are permitted by law in Government arsenals. The reason for this accuracy is that cost estimates are made by men who are familiar with shop procedure and have had at least six years' experience as a journeyman mechanic. Mr. Davies was one of the speakers on Navy Night of the A.S.T.E. meeting.



A. H. d'ARCAMBAL

Retiring President, A.S.T.E., was presented with a life membership certificate in the society and a silver coffee service in appreciation of his efforts during the past year.

Describing the manufacture of 16-in. rifles, Mr. Davies indicated that such guns are about 65 ft. long, weigh 100 tons and require 6000 hours to finish machine from the rough turned forgings delivered from the three suppliers—Bethlehem, Midvale and National Forge & Ordnance. The tube is the first element to be worked on and is bored with packed bits supported by oak lumber 90 in. long and 0.012 in. larger than the diameter of the finished bore. Bits are made of straight tungsten tool steel. The tube is first bored from the muzzle end and then from the breach end for one-sixth of the length. If the bore shows more than 0.003 in. runout, the tool is adjusted and the tube rebored with successive light feeds until straightness is attained. Then the tube is finish bored with a flat bit 1½ in. long. Bore is checked with a three-prong star gage.

In assembling the complete gun barrel the hoop is first shrunk on the tube, which is positioned vertically in a pit, breach end down.

The heated hoop is carefully checked for inside diameter before being lowered over the tube. The jackets and remaining hoops are then assembled by shrinking in place in a similar manner. The tube is then rebored to a conical shape by the use of tapered pack bits, similar to a taper reamer with two cutting edges. The liner is then turned to corresponding taper diameter and the tube is shrunk over it.

Remaining operations on the gun are to chamber the breach end, rifle the barrel and cut the screw block liner and mount the plug. Rifling is performed one groove at a time by pushing a rifling head through the tube, the head being mounted on a bar with helical keyway of proper lead and right-hand twist.

Mr. Davies indicated that there were now 15,000 men employed at the Naval Gun Factory at Washington, most of them highly skilled machinists. Most items are produced in limited quantities, with no real production lines and with a minimum amount of special tools, fixtures and gages. This arsenal has recently toolled up, however, to produce 15 anti-aircraft gun mounts a month. Barrels for these 5-in. guns, unlike those for the big guns, are made from single forgings which are expanded radially under hydraulic pressure varying from 80,000 lb. per sq. in. at the breach end to 45,000 lb. at the muzzle end.

Primary Contractors Producing

At the same session, E. M. Sims, president of the Metal Forming Corp., and speaking in behalf of the National Association of Manufacturers, said that based on early returns of 30,000 questionnaires sent out by the N.A.M., 96 per cent of all orders placed with primary defense contractors were already in the production stage. Of this number, only 25 per cent of the contractors believe that they will not be able to meet the production schedules originally set. Sub-contracting, Mr. Sims said, has more than doubled since January but even wider distribution of work to sub-contractors is needed.

Based on the number of defense

contracts placed last December, Mr. Sims estimated that 18 billion man-hr. of work would be necessary to complete the program. More recently, the United States has been committed to a policy of supplying the needs of all the democracies facing the dictators. Under these new conditions the full scope of the defense effort has not been defined. A clearly drawn specification of the job to be done is needed by industry to replace a lot of guesswork, Mr. Sims declared.

The speaker thought it difficult to reconcile the administration of some of the latest social legislation in terms of all-out defense effort. Sectional wage differentials under the Walsh-Healey Act have automatically eliminated certain competition, and the Wage-Hour Law is a deterring element. We cannot afford to stop short of any reasonable extension of hours, Mr. Sims said. Extension of hours at this time will tend to cushion the shock of readjustment after the defense effort is over, and right now an increase of 5 per cent in the number of hours worked would be the equivalent of the addition of the entire 1939 output of machine tools, as far as production effectiveness is concerned.

Speaking of the current epidemic of strikes, the speaker warned that small strikes in key plants were having a devastating effect on certain vital programs. Mr. Sims favors the enforcement of a cooling-off period before a strike vote is allowed to be taken.

Aircraft Fuselage Production

At the session on aircraft production, C. W. Van Ranst, chief aircraft engineer, Ford Motor Co., revealed for the first time design details of the Ford liquid cooled, straight-in-line aircraft engine. (See the "Assembly Line" of this issue.) The other speaker was Louis Biehler, formerly assistant chief tool designer, Vultee Aircraft, Inc., and now assistant superintendent, aircraft division of Pullman Standard Car & Mfg. Co. He described in detail how large jigs for fuselage construction are made. In a light bomber, over two million rivets have to be driven and because the skin carries an appreciable part of the load it is necessary that a tolerance of 0.015 to 0.030 in. be preserved in riveting all attachments. Hence elaborate jigging is required to hold all components firmly in position



OTTO W. WINTER

First Vice-President, A.S.T.E.

until the holes are drilled and reamed and the rivets driven.

In the assembly of large planes, it is essential to compensate for difference in thermal expansion of the steel jig and the aluminum alloy wing or fuselage. Floor movements due to temperature changes must also be taken into account. Transit, plumb bob and wire are used in maintaining alignment on these big jobs and final drilling and reaming of all holes is done at constant temperature.

In answer to a query from the floor about forming duralumin with rubber dies, Mr. Biehler said that a pressure of not less than 1200 lb. per sq. in. and preferably 1500 lb. on the rubber die pad is required. When forming SO Al-clad, a 3-deg. allowance for springback must be made on the punch plates, and on ST material, 7 to 11-deg. springback must be allowed for. (See "Job-Lot Aircraft Stampings," THE IRON AGE, Oct. 19 and 26, 1939.)

Emergency Training

How the Wright Aeronautical Corp., Paterson, N. J., in 1940 had absorbed 2700 trainees from a short course in a vocational school was described in great detail by Bartley Whiteside, supervisor of training. Most of the machine operators obtained in this way had had no previous experience in a

metal working shop, but up until now only 50 had dropped out of the plant and of these 34 had left of their own accord. The plan is based on a four week course in the Paterson Vocational School, plus two to six weeks' additional training in the shop as an observer and finally as a full fledged operator.

The first week in school is spent in classroom instruction, including a brief review of machine shop arithmetic, shop science, blueprint reading, study of operation sheets and a review of measuring instruments. On the basis of grades obtained in this first week (40 hr.), the student is arbitrarily assigned to learn the operation of a single class of machine tool. Promising



RAY H. MORRIS

Second Vice-President, A.S.T.E.

students are given two additional weeks of schooling for assignment as inspectors.

Upon completion of the usual four-week course, the young man (age 21-30) is sent over to the Wright employment office as called for (20 drill press operators, 10 external grinder hands, etc.) and put to work alongside an experienced operator as an observer, gradually taking over the full duties as an operator. The rate structure for the learner is based on a percentage of the unit production, set up on a graduated scale until finally the learner-operator is able to meet the 100 per cent job re-

quirements and is paid the standard bonus rate for performance.

All referrals to the school, since July 1, 1940, have been made through the New Jersey Employment Service. Candidates must pass a physical examination and meet certain standards of height. Standard intelligence and temperament tests are being used to aid in selecting suitable trainees. The teaching staff in the school, which is operated on a three shift basis, is composed of competent operators from the Wright plant. These men teach on a full time basis and are paid through Federal funds. They are also paid a nominal salary by the company so as to keep their names on the payroll and



CLYDE L. HAUSE
Secretary, A.S.T.E.

maintain seniority rights. Much of the equipment in the vocational school is used machinery donated by the Wright company and corresponds with every type of production machine tool found in the Wright plant with the exception of highly special purpose machinery.

Close Coordination Needed

Classroom instructors are either the regular instructors of the school or men from the Wright production engineering department, who teach class one week out of three.

Mr. Whiteside stressed the need for close coordination between



FRANK R. CRONE
Treasurer, A.S.T.E.

munity (not then working); (2) making a survey of the local job possibilities, and (3) organizing local committees who have the will to do something about the problem.

When the problem reversed itself and became one of training workers for whom jobs were awaiting, it also was tackled on a local basis. Mr. Gray emphasized the fact that job training is a local problem and must be keyed to the specific requirements of local industries. At present 200-hr. emergency training programs are standard throughout the State, all keyed to local needs: Riveters and sheet metal operators are being trained in Bridgeport for an aircraft plant, finish filers for a firearms plant at Hartford, and welders in a third city, with machine tool operator training in all centers. A modification of the plan is a 320-hr. course for training machine set-up men for turret lathes.

Mr. Gray expressed doubt that training within industry, that is upgrading men already at work to jobs of higher skills can work out successfully without cooperative outside school programs, particularly in the smaller plants, which are in the majority. He believes that job training should be centralized in the school systems, but that industry should take sufficient interest that practical shop men are obtained to teach metal trade courses. Training within industry should be tied up with community planning, Mr. Gray advocated, but can only be done if industry takes a greater civic interest than it has in the past.

The educational session at which these two papers were presented was presided over by Herbert D. Hall, chairman of the Educational Committee of the society. In discussing the papers presented, James R. Weaver, manager of the Louisville Ordnance Division of Westinghouse, reviewed briefly the work of this committee. He indicated that a four year industrial high school course had been prepared and was being submitted to industry and school supervisors for criticism. The committee is also at work on a modified apprentice program and is preparing to recommend courses in tool engineering for colleges.

school and industry in the manner indicated above. In Paterson, for many years, there have been trade advisory groups to the Board of Education. The Wright company has three representatives among the metal trades trustees. These men advise on training policy, selection of instructors and selection of equipment. The rapid expansion of aircraft engine manufacture has been anticipated several years before the war in Europe broke out and a cooperative program of training on a long term basis had been started three years ago. The emergency therefore largely meant the speeding up of existing arrangements and the changing of objectives from the training of skilled machinists to the training of single machine operators.

Another speaker who stressed the need for cooperation between industry and the schools was Carl A. Gray, president of the Grenby Mfg. Co., New Britain, Conn., who spoke on the so-called Connecticut Plan of training. Unlike most emergency training programs in use today, the program which Mr. Gray has headed began several years before the war as a means of increasing employment in the State. The job was done on a local basis in local shops by the following procedure: (1) Making a survey of the employables in the com-

New Equipment . . .

Heat Treating and Process Control

In the following pages we discuss recent additions to the field of heat treating furnaces, quenching machines, carburizing, combustion furnaces, temperature and program controls, pyrometers, timers, gas analysis apparatus, etc.

MORE uniform heat treatment and increased production of aluminum and magnesium alloys can be achieved with a new furnace built by the *Despatch Oven Co.*, Minneapolis. The temperature uniformity of this furnace is 5 deg. at 950 deg. F. This is brought about by the use of oversize, large volume high static pressure fans which drive the air at over 20 m.p.h. through heat distributing ducts. It is possible to effect quenching within 18 to 20 sec., it is stated. There are eight thermocouples, four on either sidewall. As the aging and solution heat treatment of aluminum alloys requires considerable time, there is a safety limit switch to prevent damage to the load, if contactors should stick. The full 100 kw. are required for the first 2 hr., later the consumption tapers off to a range between 25 and 30 kw. Practically 100 per cent recirculation is used with this furnace. Electric or gas heating systems are optional.

Induction Heating Apparatus

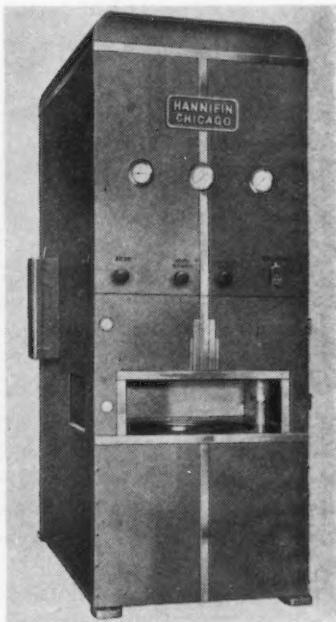
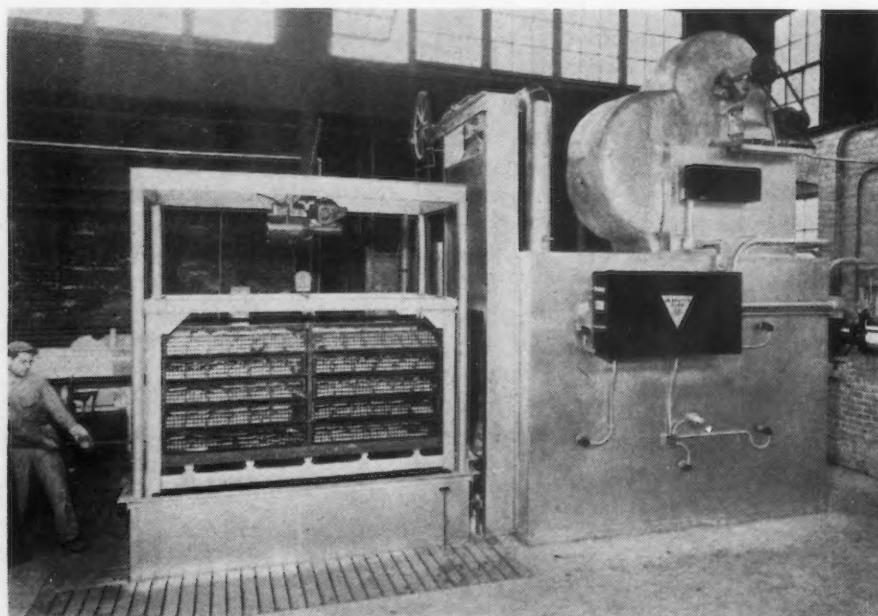
JUST announced by the *Ohio Crankshaft Co.*, 6600 Clement Avenue, Cleveland, is a specially designed utility unit for heat-treating small parts, the Tocco Junior machine at 20 kw. capacity. Two high frequency models are offered, one for annealing, brazing, soldering, heating for forging and form-

ing, the other for localized Tocco-hardening (illustrated). In the hardening machine a transformer housing and work pan have been added to the basic unit. These smaller models incorporate the well-known Tocco features and use current of 9600 cycles at 220 volts. For Tocco-hardening, pre-set fully automatic controls and a suitable hardening fixture are provided. Air filters prevent clogging air cooling ducts, and for operation only water and electric mains are required.



Quenching Machine

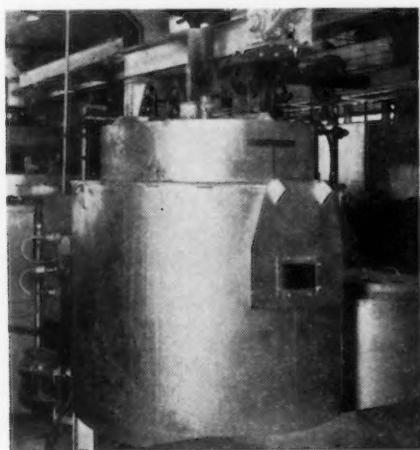
ACCURATE and controlled quenching of circular parts of all kinds can be obtained with a new centrifugal quenching machine manufactured by the *Hannifin Mfg. Co.*, Chicago. It is claimed that fully automatic quenching will result in an improved product. The circular parts (gears, sprockets, etc.) are placed between a holding fixture and then subjected to the automatic



cycle in which all variables are adjustable: Quenching fluid temperature and volume, length of immersion time and turbulence of the medium. The quenching medium is introduced from one corner of the quenching tank and a circular current is effected and its temperature is kept constant by a continuous influx of fresh liquid.

Gas-Carburizing Electric Furnace

FOR case-hardening steel parts a new gas-carburizing electric furnace has been announced by the *General Electric Co.*, Schenectady. A hydrocarbon propane gas, circulated rapidly through the charge, is used as a source for the carburizing process. Since the gas is uniformly distributed in the furnace, a case of uniform thickness forms on every surface, regardless of position in the load. The gas is passed into the chamber through an inlet



located at the bottom of the retort at the periphery of the circulating fan. The amount of carbon in the furnace is controlled by measured regulation of the flow of gas and the rapid circulation assures quick heating and uniform temperature distribution. Parts in the charge reach the carburizing temperature much more quickly in the new furnace than in the older packing box method.

Thermocouple Checking Furnace

GREATER accuracy and a wider range of testing temperatures are claimed for the redesigned thermocouple checking furnace by *Leeds & Northrup Co.*, 4934 Stenton Avenue, Philadelphia. This small electric furnace gives checks to within ± 1 deg. F. between room temperature and 1000 deg. F. when



a copper equalizing block is used which has five wells for the insertion of one standard and four checking thermocouples. Without the block an accuracy of 3 deg. F. is attainable over a range from 300 to 1800 deg. F. Furnace operates on d.c. or a.c., 115 or 230 volts, consuming at the rate of 40 watts at 300 deg. F. and 1000 and 1800. To raise the temperature rapidly the input can be increased to 5000 watts.

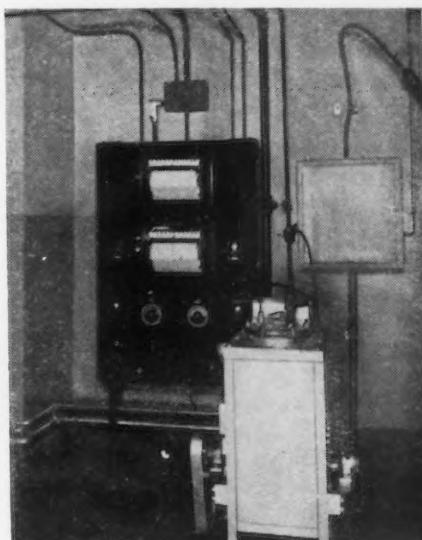
Combustion Furnace

A SMALL two-tube furnace for combustion analysis is now being manufactured by the *Harry W. Dietert Co.*, Detroit, in addition to the single tube furnace under the trade mark of Varitemp. The front of the furnace forms a switchboard on which is mounted the pyrometer, electric switch and two switches for selection of proper voltage to maintain a chosen temperature. The maximum temperature is 2750 deg. F. The heating elements are four Globars of the Carborundum Co. All electrical parts are enclosed in a compartment in the lower ventilated portion of the furnace,

which is well insulated to prevent excessive heat losses.

Flexible Program Control

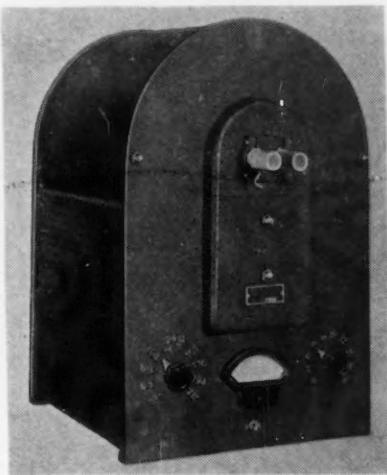
A PROGRAM control system which is claimed to be completely flexible has been developed by the *Brown Instrument Co.*, Philadelphia. It will control heat treating processes independently and automatically. It consists essentially of a potentiometer type controller of which the control index can be moved up or down scale through a control point drive motor which is mounted in the instrument. The rate of heating is governed by a current interrupting device which, in series with the motor, controls the rate of travel of the index. If the temperature has to be held for a certain length of time, a timer will accomplish



that part of the control scheme. Adjustment of the program is simple and no cams have to be cut, the whole process being directed through the timer, index of the potentiometer and its drive.

Portable Precision Galvanometer

THOSE who need a portable instrument for checking thermocouples, or for measuring small currents can obtain additional precision with the 8667 Indicator, also by *Leeds & Northrup*. Only a small portion of the range on a continuously adjustable slidewire is calibrated. The remainder, adjustable in fixed steps, is on a dial switch of 10 highly accurate resistors, range from 0 to 111 millivolts with a limit of error of ± 0.1 millivolt. Completely self-contained, this new potentiometer is light and compact. No accessories are required except



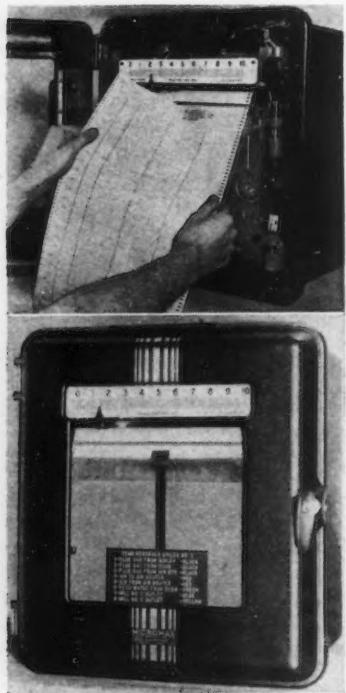
the thermocouple and an ice bath for the reference junction. Built into this potentiometer are coarse and fine battery rheostats, pointer galvanometer, standard cell, bat-



tery, galvanometer key and standardizing key. The case measures $12\frac{1}{4} \times 7\frac{3}{4} \times 7\frac{1}{8}$ in.

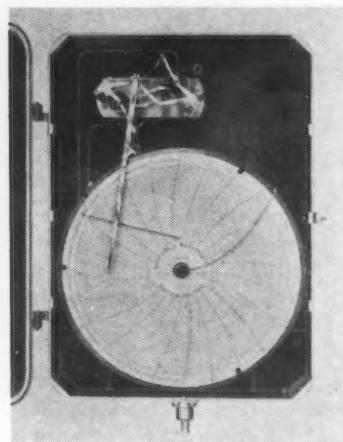
Strip-Chart Tear-Off

HITHERTO circular charts for temperature recording have had the advantage over strip charts in that they showed a complete record for a definite period. *Leeds & Northrup Co.* has now devised a tear-off attachment for its Micro-max recorders, which makes possible the clean separation and convenient filing of the daily temperature record. A rubber stamp can be furnished which identifies the recorder and the location of the thermocouples.



Recording Thermometers

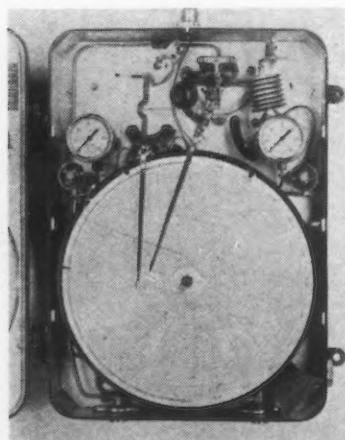
LIQUID filled recording thermometers have been improved by the *Bristol Co.*, Waterbury, Conn. The field of application has been extended by the new design of measuring elements, tubing and bulbs. They are available for use in temperature ranges up to 400 deg. F. One model comes with tubing lengths up to about 10 ft., the other equipped up to 200 ft. between in-



strument and bulb. Sensitivity and accuracy are said to have been improved and the strength of the instrument is considerably greater. Uniformly accurate results are obtained over a wide range of temperature changes along the tubing and in the case.

Pre-Set Free Vane Controllers

PROCESSES that are likely to exceed a limiting value will find a suitable controlling instrument in the new apparatus brought out by

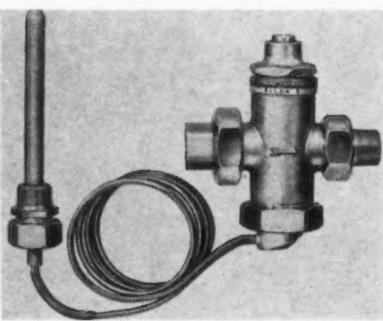


Bristol as a pre-set feature to its line of free-vane controllers. Particularly batch processes are likely to exceed a control temperature point on the starting-up cycle, largely due to slow rate of circu-

lation and resistance to heat transfer. On processes of this type the new controller introduces a pre-setting effect that is proportional to the width of throttling range and also the rate of change of the condition being measured and controlled. The controller action occurs during the approach of the pen to the control point. A gradual approach to the limiting temperature or control point is effected. This pre-setting effect may be adjusted over a wide range by convenient pointer arrangement.

Temperature Control Equipment

STERLING, INC., 3666 North Holton Street, Milwaukee, announces a new item in its line of Thermotrols, self-contained, self-powered temperature control equipment. This is a direct acting, thermostatic control for tank and process applications to regulate the flow of steam or water. Typical applications are on the steam supply to heated water storage tanks, drying ovens, scalding and pickling vats, fuel oil preheaters, etc. A

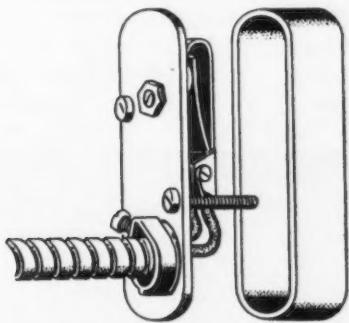


modern simplicity of design makes possible a sensitivity of $1\frac{1}{2}$ deg. F. This durable unit controls temperatures on applications where formerly it would have been considered too costly. It comes in a variety of sizes and finishes.

New Thermostat

HEAVIDY duty thermostat comprises a thermostatic element suitable for electrical heater loads of 1500 watts at 115-230 volts a.c. The element is mounted on a removable cover which facilitates accessibility and wiring. A $\frac{7}{8}$ in. hole is provided in the cover for a BX cable connector, and two 10-32 mounting screws fasten both the cover and base to any flat surface. When mounted, all live metal parts are concealed in the assembly. The thermostat is especially suitable for controlling the temperature of

electrically heated surfaces such as hot water heaters, hot plates and heated machine parts. Available in maximum temperature ranges of 300, 450, and 700 deg. F., it is supplied with normally closed contacts



to open with rise in temperature or with normally open contacts. This apparatus is built by *George Ulanet Co.*, 50 East Kinney Street, Newark, N. J.

Radiation Pyrometer

IMPROVEMENTS are announced by the *Brown Instrument Co.*, Philadelphia, in its Radiamatic pyrometer. This is completely self-contained, compensated for temperature errors and operates under severe conditions of temperature, vibration, etc. This pyrometer

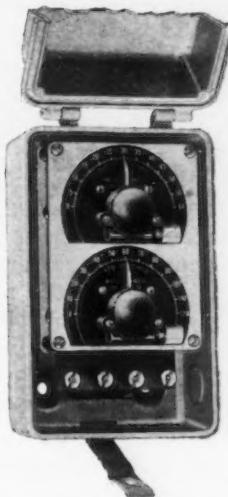


works by concentrating the heat radiation from the heated incandescent object on a thermo-pile. The current generated is measured by a potentiometer which is calibrated to read in degrees F. The instrument is ruggedly constructed to resist vibration and corrosion, for special applications where vibration, movement of heated object, furnace atmosphere, etc. make installation of thermocouples impossible.

Double Reset Timer

AUTOMATIC double reset timer has been designed by the *R. W. Cramer, Inc.*, Centerbrook, Conn., for industrial applications requiring an adjustable and rapidly repeating cycle. This double reset

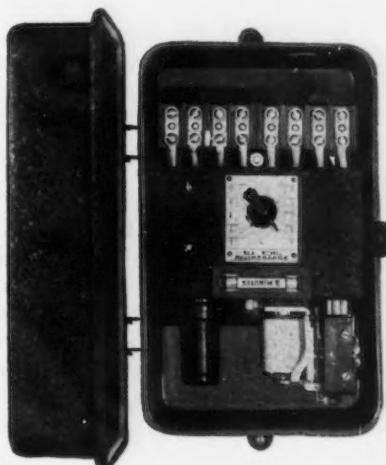
timer consists of two Cramer timers mounted on one panel and controlling common electrical circuits. Precision micrometer adjustments and "band-spread" time scales are provided to facilitate accurate settings. Die-cast housing provides protection and is simple for mounting and wiring. A typical application is the furnishing of a 10-sec. impulse every 90 sec. In operation one timer closes the circuit after every 90 sec. and the other



opens it after the lapse of 10. Operation is thus continuous. These instruments are furnished for 110 or 220 volt and 50 or 60 cycle operation, time ranges available are 15, 30, 60, 120 sec.

Electronic Timer

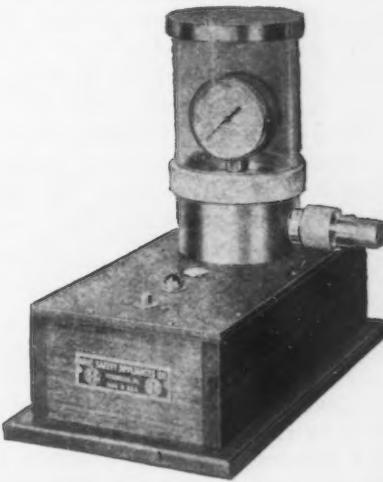
THE Photoswitch electronic timer supplements synchronous and mechanically driven timers since it is suitable for extreme accuracy over short timing intervals. It has a life which is many times that of any available timing equipment. A typical installation is in connection with welding machines. The electronic



timer alone is claimed to be sufficiently accurate for timing intervals as required in welding processes. It is also used in connection with furnaces for process timing and for timing operations on a variety of machine tools. Its timing range extends from 1/20 sec. to 2 min. This is accomplished through a snap action relay of 1000 watts capacity. The apparatus is produced by *Photoswitch Inc.*, 21 Chestnut Street, Cambridge, Mass.

Gage Tester

MINE SAFETY APPLIANCES CO., Braddock Street, Pittsburgh, announces a new tester for compressed gas storage cylinder gages to determine their ability to withstand sudden applications of pressure. Energy created by the discharge of a blank cartridge is utilized as a source of pressure. This is transmitted directly to the gage, causing it to function in a normal manner under high initial loads. A signal light indicates that the gage has been



subjected to the required test pressure and a transparent guard, covering the gage to be tested, permits visual observation at all times.

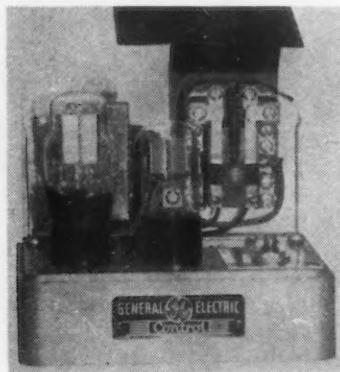
Buzzing Timer

ANEW buzzing timer has been added to the electrical instruments of the *Industrial Timer Corp.*, 101 Edison Place, Newark, N. J. A range of timers is covered which indicate periods from 1 to 55 sec. to 1 to 55 min., but this can be extended to meet customers' requirements. The timing period is selected on a visible dial with pointer set to desired time calibration. The buzzer timer will after the lapse of the period automatically switch off

the current and give out either a buzzer or visual warning on the spot or in a distant control room. This timer has a great many industrial applications.

Photoelectric Relay

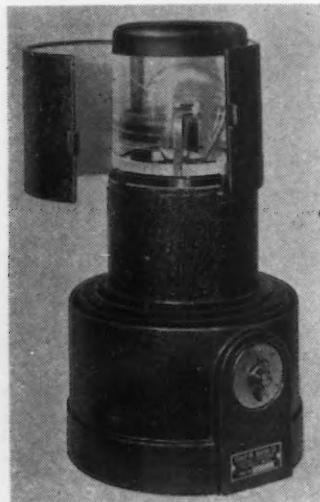
COUNTING, sorting, weighing, signaling, measuring, controlling are some of the applications for the new photoelectric relay brought out by *General Electric*. It will operate up to speeds of 150 in-



terruptions per min. and at a minimum of 40 foot-candles at the phototube with not more than 15 foot-candles of extraneous light present. The relay coil is energized when the light at the phototube is reduced below 30 foot-candles. Mounting can be arranged to suit individual requirements. The finish of the apparatus has been carefully styled.

Film Dryer

INCREASED use of films in spectrographic analysis makes a new film dryer interesting. This is produced by the *Harry W. Dietert Co.*, 9330 Roselawn Avenue, Detroit. It will dry a 16 in. length of 36 mm. film in 50 sec. without curling the

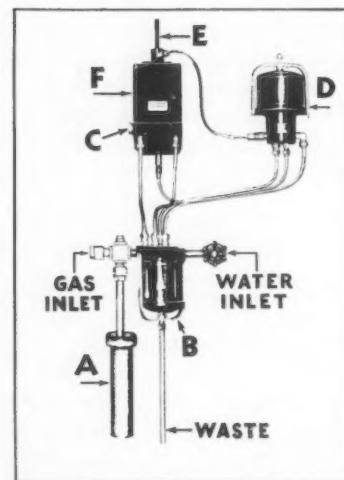


54—THE IRON AGE, April 3, 1941

film. The action is effected by an infra-red light bulb combined with cleaned and heated air which circulates through the dryer. Two doors give easy access to the glass form holding the film and an electric timer which starts and stops the mechanism makes the process fully automatic.

Automatic Oxygen Measuring Apparatus

DETERMINATION of the oxygen content in a gas may be of importance in many industrial processes. The *Cambridge Instrument Co.*, Grand Central Terminal, New York, has developed an ingenious method of continuous analysis which may be graphed or read off an indicator. This is based upon thermal conductivity difference between the gas before and after the removal of oxygen, thermal conductivity offering a direct indication of the oxygen in the gas. Thus a sample is drawn into the measuring cycle through the aspirator B. From there a portion passes via

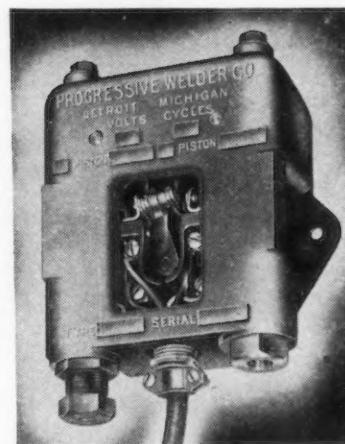


pressure reduction valve and filter C to collecting bell B and to analyzing cell D. Here the conductivity of the gas "as received" is measured. Then the gas passes through E to the furnace F where the oxygen is reduced by a heated carbon rod to CO₂. Passing back into the analyzing chamber D the gas is again subjected to a conductivity test and thence passes to waste. A meter measures the difference in reading between the first and second measurement and indicates the amount of oxygen that was in the gas originally. The furnace is self-contained for a week, providing itself with carbon for that period. The result is not affected by any

changes in the original CO₂ or N₂ content.

Hydraulic Pressure Switch

UNIVERSAL non-flutter snap action switch for balancing hydraulic pressures within 5 lb. variation has been evolved by *Progressive Welder Co.*, 3017 East Outer Drive, Detroit. Switch is



designed for two distinct capacity ranges, permitting the use of a single switch for numerous applications and a wide range of operating pressures, which extend from 200 to 1000 lb. per sq. in. to a second range from 900 to 3000 lb. per sq. in. This switch will not flutter or bounce under unusual pressure impacts. A spring loaded screw can be adjusted to within 5 lb. to balance hydraulic pressures at any selected point. Electrical connections permit the switch to operate on a normally closed or a normally open basis. A window permits continuous visual inspection. Any voltage can be handled but amperage should not be in excess of 30.

High Temperature Lubricant

TO overcome the difficulty of high temperature lubrication which is important for bearings on heat treating furnaces and equipment parts, the *Acheson Colloids Corp.*, Port Huron, Mich., has brought out a new lubricant. In this new material from 0.2 to 2 per cent by weight of Dag colloidal, non-flocculating graphite are dispersed in a suitable volatile vehicle. The colloidal graphite goes with the fluid to the bearing surfaces and even infrequent applications will keep the bearings well lubricated. Accumulations of objectionable deposits are considerably reduced or completely eliminated.

Revere Copper and Brass Incorporated

Executive Offices

230 Park Avenue

New York

C. Donald Dallas
President

To American Industry:

Virtually the whole production of Revere Copper and Brass today is directed toward arming the nation and the allies of democracy beyond its borders.

We do not make tanks or ships, fighting planes or machine guns. But without the products we do make, these would be useless. Every bullet, every shell and every cartridge needs copper or brass or the other copper base alloys—so do torpedo heads and army field kitchens—condensers of battleships and oil coolers of fighting planes.

It is our first task to insure an unfailing supply of metal products vital to defense.

In addition to this grave new responsibility, we recognize our long established responsibility to our old customers. And so we are gearing our defense tasks to allow the best possible production for non-defense too. But there are many cases where it is not possible to do both.

Revere, however, has always rendered service to its customers beyond the mere supplying of metal. And, even though we may not be able, in some cases, to supply the metal you ask for, we would still like you to call for these services—to use, at no cost or obligation, our vast file of data on copper and its alloys and our Technical Advisory staff. It may be that we can cooperate with you in suggesting ways for you to replace metals or alloys needed for defense by other metals or alloys, equally efficient and immediately available.

Sincerely yours,

C. Donald Dallas
C. Donald Dallas

DETROIT — More than a little uneasy at the prospects ahead, the automobile industry is beginning to see its war-time future assume both shape and proportion that can be understood. Understood, even if not reduced to an exact scale or perfectly interpreted yet.

This industry has passed, along with government and the rest of the industrial world, from the "business-as-usual" phase of thinking to the "as-much-business-as-you-can" stage of action. Because of its size and ability to maintain a fast pace once it has picked up momentum in the production of new cars, it has been extremely successful in this second stage, even while it has prepared with utmost rapidity to make defense contributions in proportion to its size. Now, however, tooling for mass output of defense weapons is within sight of an actual production schedule (the July-September period will see assemblies of many important defense items started at last) and the industry is gearing its thinking and its plans to a new attitude, best expressed as "business-as-long-as-you-can."

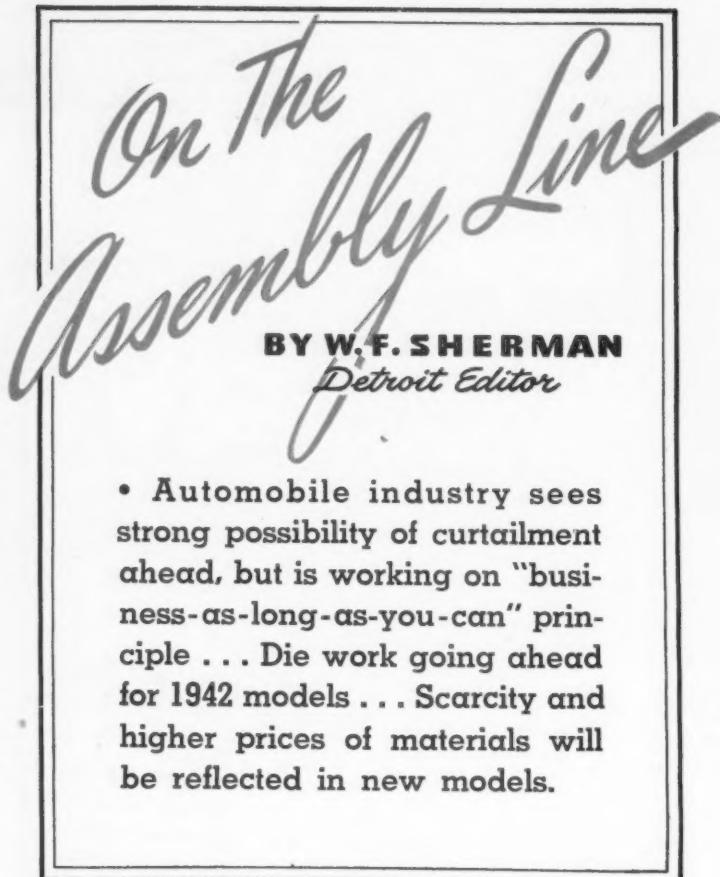
For the benefit of many suppliers, including the steel industry, the winter buying splurge stands in need of some comment. It resulted in a period of extremely high production for many winter weeks, and established a high level of auto output that may not be witnessed again in the winter for years.

That buying, and consequent high production, came as the public, realizing that a prosperity wave of important proportions was upon us, decided to use its money to get a new car before shortages or taxes interfered. It is probably true that such a buying splurge has robbed the future of some new car demand—but there probably will be enough buyers in the spring to swamp the dealers anyway, and after that it will be a nip-and-tuck race to see whether material shortages or lack of enough skilled labor will decrease output below new car demand.

High Inventories Built Up

A secondary impetus to high mid-winter production (at least it has proved to be secondary) was the manufacturers' attempts to build up inventories for spring, and thus "beat" the restrictions and ceilings to production which all realized would eventually come. They have accumulated unusually high inventories, they admit, but don't expect to be left with any merchandise in the warehouses.

All the steel that was bought during the fall and winter will be used; that much is assured and can be



• Automobile industry sees strong possibility of curtailment ahead, but is working on "business-as-long-as-you-can" principle . . . Die work going ahead for 1942 models . . . Scarcity and higher prices of materials will be reflected in new models.

demonstrated by the current reports on available quantities of Buick, Olds and Pontiac body steel. Forced by the steel delivery situation to make final decisions on tonnages early in this model year, each (or Fisher Body acting for them) made heavy buys. Now it turns out that Buick and Olds will not quite reach their intended production goals, but Pontiac foresees an excellent chance to sell more than the 319,000 cars in its quota. The three lines of cars use virtually interchangeable bodies, as is well known in the trade. What will be done about the surplus Buick and Olds steel? It will not be given to Pontiac, which will stop production when it runs out of body steel for 1941 models, but will be reserved for use on initial production of 1942 models for Buick

and Olds—and will prove to be a welcome "kitty."

Buyers for the auto companies are attempting to obtain coverage for all materials to be used during the forthcoming model year, but are actually pressing only for commitments until Jan. 1, 1942. They are being rebuffed on two points: price and assured deliveries. This is especially true in regard to parts made of critical or strategic materials, and most suppliers are inserting clauses that protect them if they cannot get materials. Price increases on parts are the order of the day, and there are few exceptions.

Obviously, these factors are going to be reflected in the 1942 cars; deliveries will be difficult to arrange (in proportion to the difficulties in getting materials) and prices will be moved upward. How much car prices will go up is still undeterminable.

New Models to be Started Quickly

When 1941 production of cars comes to an end (about the last of June in most cases, as it was last year) there will be a general attempt to get started quickly on 1942 models, and introductions of the new cars may be weeks earlier than they were last summer and fall. It is then that the "business-as-long-as-you-can" slogan will see its most general adoption. From then on, manufacturers know, defense production will be on the increase. When the curve of war output rises, it will reach a level where the drain on material resources and man-power will restrict auto output. How great the restrictions on auto production will be, no one—high or low in the industry—can hazard a guess. It might be 10 per cent, or it might be 50 per cent. That's why it is getting to be "business-as-long-as-you-can."

Finally, in higher circles, a first conclusion fostered by lease-lend and the various appropriation bills that



Magnesium

needs special
cutting tools

D*This is a typical magnesium part for an airplane engine . . . accurately machined, light and strong. National defense programs include many such magnesium parts . . . in large quantities.*

Here is what our experts have worked out

PERHAPS yours is one of the many shops that soon will be doing unfamiliar work in the national defense program. If you've never machined magnesium, here are some cutting tool facts that will help.

Magnesium cuts very freely . . . more so than any other structural metal . . . but it carries a fire hazard. That is why some of the metal parts in an airplane burn up when things go wrong. Because of this your cutting tools must be kept sharp and have extra smooth cutting surfaces to reduce friction. Ordinary precautions will offset the fire hazard . . . but remember the chips will burn.

You can machine magnesium dry with good results, but most recent practice uses a mixture of kerosene with either lard oil or mineral oil. This will assure cooling, produce a smoother finish, and offset distortion on thin pieces. Speeds and feeds are high—approaching those used in woodworking.

Ample chip room is essential in all tools cutting magnesium. For example a milling cutter only has half as many teeth as a cutter made for steel. You can convert a cutter by grinding out every other tooth and altering the angles . . . but be sure to smooth it up to reduce chip friction.

High rake angles work best, along with excessively high peripheral clearances . . . more than double ordinary practice. Use as much as 20° rake on milling cutters . . . 15° on taps.

Tools like taps and reamers usually are made slightly larger than those used on other materials, because magnesium seems to "hug" the tool—cutting close to size. This increase is from 3 to 4 ten-thousandths on reamers and up to .0005" on taps.

If you have special cutting tool problems, never hesitate to ask a PRATT & WHITNEY sales engineer for help. We stand ready to do everything possible to aid our friends and do our full part in speeding up national defense.

We've been making cutting tools for 80 years and our experience and knowledge is yours for the asking. Write to PRATT & WHITNEY, Division Niles-Bement-Pond Company, WEST HARTFORD, CONNECTICUT, U.S.A.



PRATT & WHITNEY

ONE OF A SERIES TO MAKE PRATT & WHITNEY RESEARCH AVAILABLE TO AMERICAN SHOPS

ON THE ASSEMBLY LINE

have gone through Congress has been that the load on American industry and on the auto plants will be doubled within a relatively short time. More than that, it is confidently expected that the rate of war output will be stepped up, probably doubled, at the same time. It is, in fact, this latter conclusion that is the real basis for the foregoing assumptions that auto output will necessarily be trimmed to an important degree in the forthcoming year.

Despite the outlook, which is not too pleasant, die work on 1942 models is going ahead at a relatively lively rate. As reported five weeks ago, die shops are generally well filled with work, although most of it is for front ends and fenders. New models—as new as they have been in some normal years—will be ready for production by July. There has been no shortage of alloying materials for die blocks, because a little stock piling was engaged in before tightness became noticeable. In fact, a large number of die blocks were cast a good many weeks ago, and materials were probably all lined up before the first of the year.

Buying of industrial materials in the Detroit area is concentrated in the three-to-nine-month period ahead, and there has been an increase in the nine-month concen-

tration from 11 per cent in January to 17 per cent at the end of February, according to the latest report of the Purchasing Agents' Association of Detroit. These data reveal that 1 per cent of the Detroit buying is on a hand-to-mouth basis, also 1 per cent on a 30-day basis—with another 5 per cent on a 60-day basis. Buyers maintaining the short-range policy are obviously in lines of business where supplies are still plentiful, as in paper and grey iron, the "Detroit Purchasor" reports. Totals show that 93 per cent of the buyers are buying from three months to a year ahead, compared with 94 per cent in January.

Details of the Ford aircraft engine were revealed to the Tool Engineers last week by C. W. Van Ranst, engineer in the Ford Aviation division. It will be an in-line, liquid-cooled, V-12 upright type and will develop 1800 to 2000 hp. at 36000 r.p.m. with supercharging. Displacement will be approximately the same as in the Liberty engine (1650 cu. in.) which delivered 450 hp. at 1700 r.p.m. It is comparable to modern engines of the same size supercharged to more than 1000 hp. Design has been aimed at getting more horsepower out of a given size engine, rather than enlarging the engine.

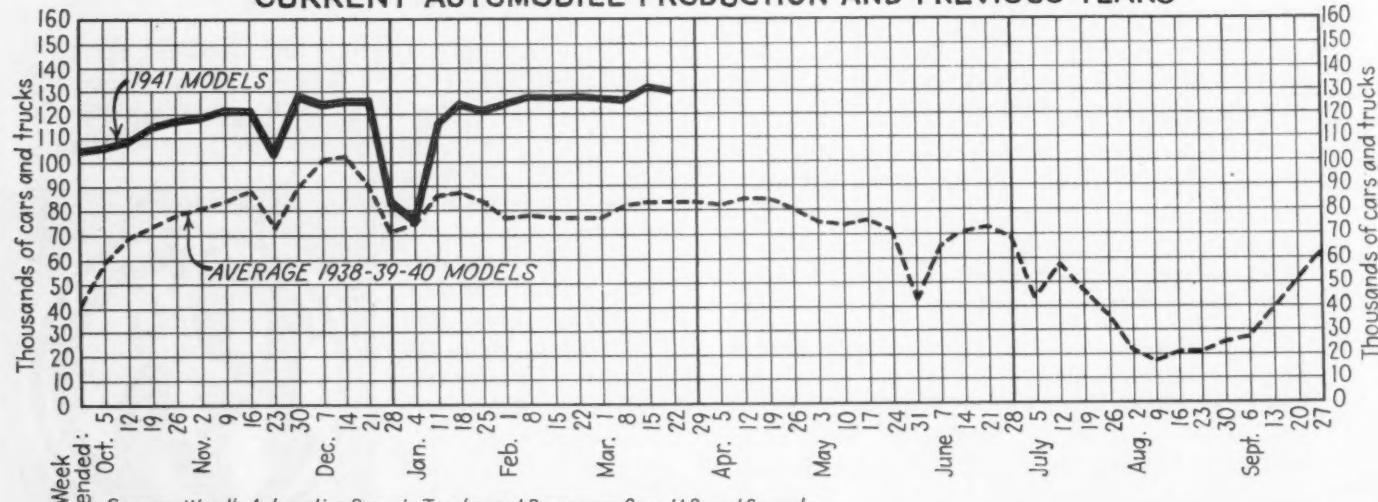
It is highly supercharged with a

newly designed exhaust driven turbine and centrifugal compressor with an intercooler unit. There is no mechanical connection between the engine and the supercharger. The engine and supercharger have been designed as a single power unit—in contrast to previous instances in which superchargers have been separate units which the airplane designer had to fit some place in the engine compartment.

Some resemblances to the Ford V-8 automobile engine are apparent. For instance, the engineers have designed a cast steel counterbalanced crankshaft similar to that pioneered in the Ford V-8. To increase rigidity of the engine structure, the cylinders and the crankcase will be an integral aluminum casting. Water cooling jackets will extend the full length of the cylinder barrels. They have adopted a dry type of cylinder liner centrifugally cast of oil hardened steel instead of from a deep drawn piece of fender stock as the automobile cylinder liners are.

Automobile production in the past week stayed at approximately the same level as in the previous week. According to Ward's Reports, Inc., output in the past week was 124,165 compared with 123,805 (revised) in the previous week and 103,370 in the corresponding week of last year.

CURRENT AUTOMOBILE PRODUCTION AND PREVIOUS YEARS



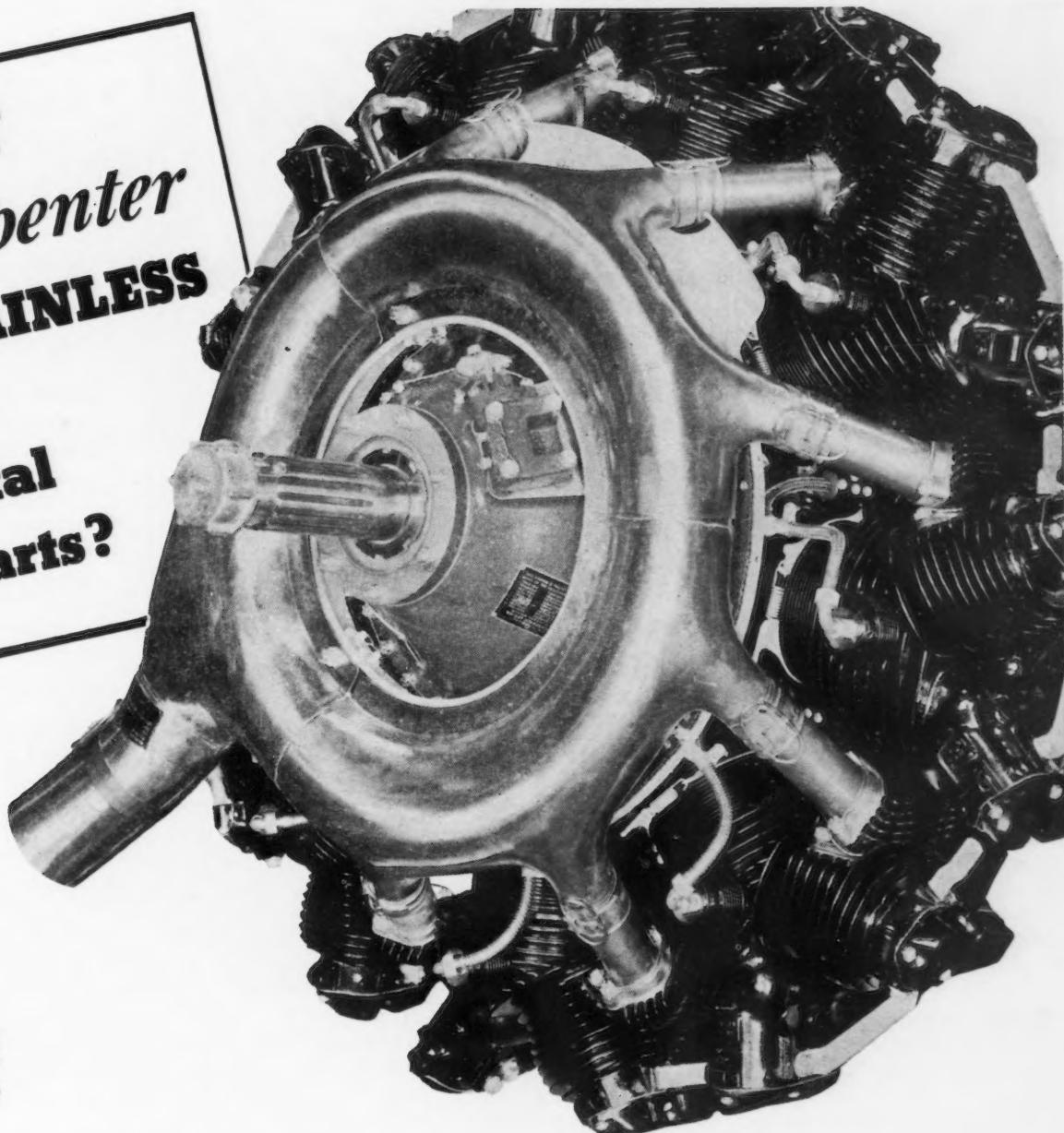
Source: Ward's Automotive Reports Trucks and Passenger Cars, U.S. and Canada

PRODUCTION COMPARISONS

	Oct., Nov., and Dec.	Jan., Feb., and March	April, May and June	July, Aug., and Sept.	Total
1938 MODELS	1,032,201	753,470	628,961	313,091	2,727,723
1939 MODELS	1,014,799	1,086,350	971,417	510,561	3,583,127
1940 MODELS	1,162,990	1,325,630	1,233,585	583,568	4,305,773
1941 MODELS	1,493,548	1,590,000*			

*-Approximate

WHY
Carpenter
STAINLESS
for
vital
parts?



Where safety is paramount—where performance is all important—where the reputation of a product is at stake—that's where you will find Carpenter Stainless Steels in use. Their controlled temper, accurate gauge and uniform physical properties have made them a favorite with the aviation industry.

Manufacturers and pilots alike have confidence in the performance of Carpenter Stainless Steels in corrosion and heat resistance applications on airplanes. The faster

working qualities of these steels are helping to speed the production of planes.

In this engine, Carpenter Stainless Steels are used in valve seats, carburetor air intake screens, butterfly valves, cotterpins and inserts. In some models, valves and exhaust manifold nipples are also made from stainless steels. So it's dependability, combined with easier working qualities, which account for the use of Carpenter Stainless Steels in vital parts.

THE CARPENTER STEEL COMPANY, 121 Bern St., READING, PA.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

WASHINGTON—Pressure on the iron and steel industry has been further intensified by passage of the Lease-Lend law and the \$7,000,000,000 appropriation to give it force. Tremendous as is the country's capacity, it faces an immense strain when it sets itself up as an "arsenal of democracy." By this commitment the United States superimposes on its own huge defense demands, not only immensely increased requirements for England, but a limitless effort to supply all other nations, particularly Greece and China, that are fighting desperately for freedom.

By the very nature of such an obligation it cannot possibly be known with any great degree of accuracy when such requirements can be supplied and shipped abroad. But that American industry not only can but will move enormous military supplies abroad may be taken as a foregone conclusion. Of this fact aggressor nations are acutely aware. Their simulated scoffing at the possibilities of American aid only emphasize their fear.

To all intents and purposes the United States is at war. It may well be that its people are on the threshold of sacrifice, toil and sweat that they now only realize dimly, if at all. To achieve success, and nothing else is conceivable or endurable, bickering will have to come to a stop. Strikes will have to be brought to an end and production must be moved up to and maintained at top speed.

Priority Control A Necessity

But even with these conditions prevailing industry will have to be further rationalized. Production and distribution will have to be based on a system of priority and allocation, whether by Government mandate or by voluntary action of industry. Whatever future developments may be, certainly those that already have emerged indicate a quick spread of OPM priority control, which by actual application means Government control of production and allocation from raw materials to finished products. And ultimately many accept as a matter of course that this Federal supervision will come about and will reach into all the fields that were covered by the War Industries Board and the War Labor Board of the World War, which means price control as well as a comprehensive system of priorities for all industries and labor control. The latter is far from a reality at present but despite disinclination to do so, it is widely conceded that if the arsenal of democracy is to function, such control during the war emergency is definitely necessary.

60

—THE IRON AGE, April 3, 1941

Washington

BY L.W. MOFFETT
Washington Editor

• U. S. must rationalize industry
still more to be "Arsenal of Democracy" . . . One requirement
is end of strikes . . . Formal pri-
orities found injurious unless
carefully administered.

Reports coming to Washington indicate that there is a division of opinion within the steel industry regarding the present necessity for priority and allocation control by the Government. In reality some products of the industry in effect are subject to priority control, though the so-called voluntary rating still prevails.

Since more ships are a particularly urgent necessity the concentrated demand for plates and shapes has become so great that both production and allocation have become a serious problem. What amounts to priorities have been applied to them and producers already have been informed of what may further be expected of them if formal priorities are invoked. The OPM questionnaire on operating capacity, and unfilled tonnage on

plates, shapes and strips has been filled out and returned to the OPM steel unit. It has prepared a summary which affords familiarity with the supply situation and what may be done to shift production, such as stepping up plate output on the continuous mill by transferring, if desirable, from sheet or strip rolling.

But if formal priorities are found to be necessary reports from the industry manifest concern that unless they are carefully administered they can prove most injurious.

World War administration of priorities on the whole operated efficiently. It affords a partial though not a complete guide for a present-day system of priorities. It cannot be a complete guide, except in principle, because of the great evolution in industry with new methods of production as well as new and specialized production. These facts obviously have been taken into consideration by the OPM Priorities Division, whose personnel and staff are intimately acquainted with the steel industry. The division is headed by a former chairman of the United States Steel Corp., Edward R. Stettinius, Jr., and on the staff are men who are directly associated with the industry.

Possibility of many Complications

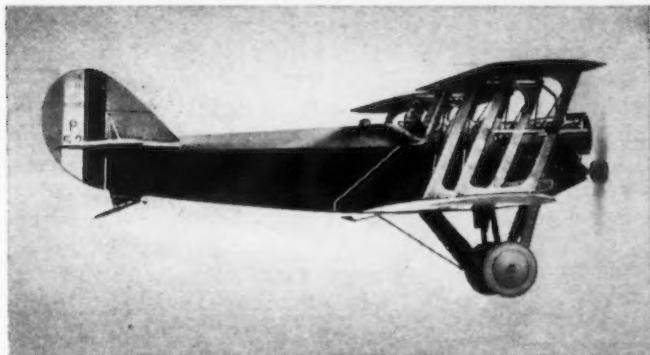
Whatever may be their justification for their views, those who show apprehension over the operation of a formal priority system think the present plan of voluntary allocation insures a distribution that might be dislocated under strict Government regulation unless it is carefully administered. An example might be cited to reflect what is in their mind. Assuming that plates are subjected to formal priorities, it has been pointed out, this would mean that slabs to be rolled into plates would have to be taken from steel, part

New Kind of Light



to speed production of fighter planes in 1941

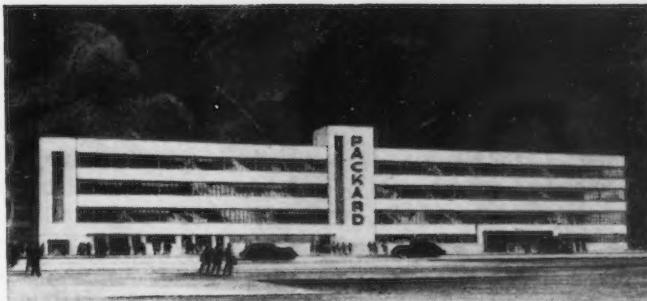
Packard orders 11 miles of new giant-size G-E MAZDA F (Fluorescent) lamps to light new airplane engine plant



1 THIS 1918 FIGHTER helped win World War I. Built by Packard and powered by the famous Packard-built Liberty motor, it helps explain why Packard got order for new Rolls-Royce engines for Hurricane and Spitfire type planes. The ultra-close tolerances of these new engines help explain why Packard is using G-E Fluorescent lighting in its big new engine plant at Detroit.



2 TO KEEP A SPITFIRE'S WEIGHT DOWN to an absolute minimum, engine parts must be finished to flawless accuracy. Under ordinary lighting, inspections alone would create a thousand bottlenecks, because speed of seeing... the time it takes your eye to absorb details... is directly dependent on the amount of light you have to see by.



3 PACKARD CHOSE G-E FLUORESCENT LIGHTING because in quality and diffusion, it approaches actual daylight conditions... and because its greater coolness and efficiency permit new high levels of illumination. Packard plant (above) ordered 5820 fixtures each using two 5-foot 100-watt G-E MAZDA F lamps, 13 feet above floor.



4 LABORATORY TESTS SHOW that the light output of G-E MAZDA F lamps has been increased as much as 40% since their introduction in 1938... while prices came down as much as 45%. Like other G-E MAZDA lamps, they're made to give maximum light throughout life... made to stay brighter longer!



5 SEE YOUR G-E MAZDA LAMP DISTRIBUTOR for a wide choice of Certified Fixtures, complete with G-E MAZDA F lamps, ready to hang up and turn on. General Electric does not make fixtures, but is glad to recommend certified fixtures bearing the Fleur-O-Lier or RLM tag. For full information, write General Electric Co., Dept. 166-IA-D, Nela Park, Cleveland, Ohio

G-E MAZDA LAMPS
GENERAL ELECTRIC

LOWER PRICES ON QUANTITY PURCHASES
of G-E MAZDA lamps—\$5 worth for \$4—\$15 worth for \$11.25! Also new larger discounts for contract purchasers! See your General Electric MAZDA lamp supplier today!

of which might be allocated for other purposes. Unless care was exercised it might be assumed that priorities on the plates would be exercised fully and immediately even though the entire plate tonnage covered could not be consumed at once. As is known, under the voluntary system many contractors receive plates as they are needed. Thus, if a fabricator has an order for 4000 tons of plates and can fabricate only 200 tons a week, he is rationed on that basis. By giving the fabricator this quantity instead of 4000 tons at once, the steel maker is enabled to supply 200 tons of plates weekly to 19 other consumers, none of whom would be serviced concurrently if the fabricator with the defense order insisted on immediate delivery of the entire 4000 tons. It might not work out that way but the assumption is made that under priorities the contractor would demand unrestricted production of his order. It is a situation that is possible unless precautionary steps are taken to avoid it.

In such a situation the remaining 19 plate users not only would be deprived of material but there might well be interference with the flow

of slabs since the 4000 tons of plates would have to be assigned immediately from the slabbing mill. With such mills heavily scheduled this would result in holding up distribution of slabs for other purposes.

There could easily be other complications. The 4000-ton plate order quite conceivably would cover various sizes and thicknesses, and this, unlike operations under a voluntary system, might mean numerous roll changes. This in itself would impede completion of the defense plate order and also slow up subsequent production for other uses. Under the voluntary system, plates are scheduled in such a way that the same sizes and gages are rolled at one time, thereby getting maximum efficiency. Also, while the point is not entirely tenable, it is also possible that a complete rolling of 4000 tons of plates would jam up the finishing end or at least require space that could well be used for other purposes. Priorities on plates that permitted such dislocation obviously would affect shipments of sheets and strip to all flat rolled consuming industries and at the same time retard tin plate output.

What is said with respect to the

possibilities of improperly controlled priorities on plates is, of course, true of other products. Priorities on structural shapes, for instance, clearly would affect production of rails, munition steels and straight billets.

This is not to say formal priorities may not be necessary sooner or later. There is a section in the industry which thinks immediate application of such priorities is desirable. But the points made include some of many that are a source of concern to those who favor continuance of the voluntary system and declare that if priorities are formally proclaimed care should be taken to reduce obstacles to a minimum.



Washington

The Labor Department's wage-hour division has amended its record-keeping regulations under the Fair Labor Standards Act to include, when overtime is worked, additions to or deductions from the cash wage paid for board, lodging or other facilities furnished the employee. This information was previously required only where the cash wage paid was below the minimum fixed under the law.

Under another revision, directions covering the computation of overtime for the first time require the inclusion of additions to cash wages for board, lodging or other facilities. Wage-Hour Administrator Philip B. Fleming explained that the amendments amend and clarify two footnotes in the wage-hour record-keeping regulations and do not add any items which employers must keep under the law.



Washington

• • • H. R. Boyer has been appointed as chief of the OPM Manufacturing Unit, Aircraft Section. Mr. Boyer is on leave of absence from his position as president of the Allen Corp., Detroit. He formerly was works manager of the Pontiac Division, General Motors Corp., and of the Fisher Body Corp. He is a graduate of the Massachusetts Institute of Technology. Mr. Boyer replaces A. J. Brandt who has resigned to return to private industry after recovery from a current illness.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



General Priorities On Ferrotungsten

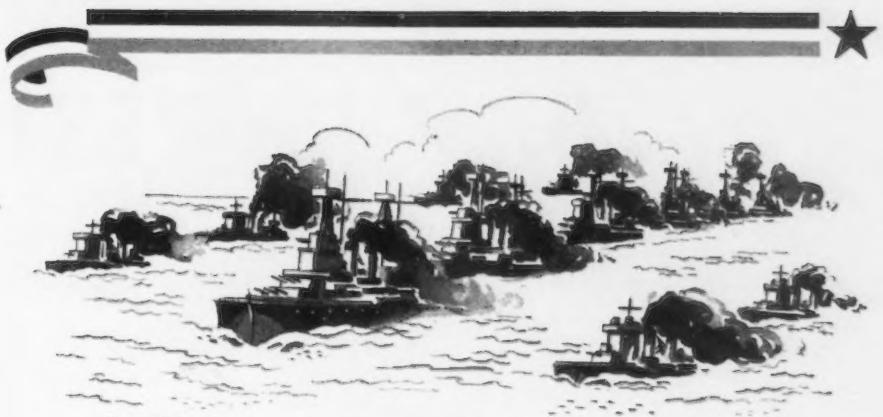
Washington

• • • Marking another point in the growth of direct government control of defense needs, a general priorities system was applied last Thursday to all producers of ferrotungsten, tungsten metal powder and tungsten compounds. These products now are subject to the system previously imposed upon Aluminum and Magnesium. OPM Director of Priorities Edward R. Stettinius, Jr., said that the action was taken after submission of a finding by Ernest M. Hopkins, chairman of the minerals and metals group, that a shortage of these types of tungsten exists. One of the most important uses of tungsten is for the manufacture of high-speed cutting tools.

The order requires that producers of ferrotungsten, tungsten metal powder and tungsten compounds give a rating of A-10 to all defense orders, including British defense orders, unless superior ratings are specifically assigned. Except as the Priorities Division may otherwise provide, this rating has the effect of putting all defense needs ahead of civilian needs.

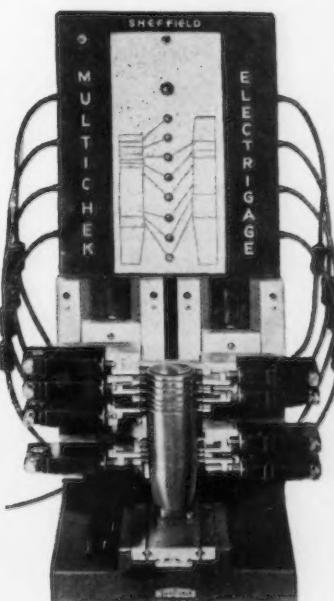
Accompanying the general preference order was a supplementary order setting forth a schedule of preference ratings, which, from A-1 to A-10 inclusive, are to be given to defense orders and to any other orders for which class A ratings may be assigned by the Director of Priorities. A preference rating of B-1 was assigned to "Customers' orders whose products currently are used in connection with the manufacture of defense orders, directly or indirectly, in substantial quantity although not bearing a specific preference rating."

Stipulation was made in the general preference order that no deliveries shall be made by the producers under any contracts or orders, other than defense orders, except by release in accordance with the assignment of preference ratings or by other specific order. For the present, however, the producers are given permission to fill non-defense orders after the A class and the B-1 class have been filled.



They SHALL NOT PASS

Unless every one of the eight critical dimensions of this 75 mm. shell checks within prescribed limits, it does not pass this guardian of quality. Six hundred an hour of these shell bodies are thus checked on the Sheffield Multichek Electrigage pictured at the left. In a flash the inspector knows whether each shell body is acceptable or not.



The slightest variation beyond tolerance limits is flashed by a colored signal light on the control board above the Electrigage head. The color of the light indicates whether the dimension is oversize or undersize. And the position of the colored flash indicates just which dimension or dimensions are incorrect. If all dimensions are correct the master signal at the top of the board so indicates. Then it is unnecessary to read individual signals.

If your problem is rapid, accurate inspection of multiple dimensions on a wide variety of parts without eye strain, write for particulars on the Sheffield Multichek Electrigage.



ON THE WEST COAST

WORK stoppages in West Coast shipyards will be eliminated under terms of a pledge made by representatives of both management and labor after a conference which has sought for nearly two months to reach a master agreement covering all Coast shipbuilding operations.

A high-sounding pledge, subscribed to by both John Frey, president of the metal trades department of the AFL, and H. Gerrish Smith of the National Council of American Shipbuilders, stated that "there will be no lockouts on the part of the employer or suspension of work on the part of the employee. This agreement is a guarantee that there will be neither strikes nor lockouts and that all disputes will be settled by arbitration."

The conference, whose membership includes representatives of all major Pacific Coast shipbuilders with the exception of Bethlehem, and of AFL shipyard workers, have been seeking to work out a formula of wages, hours and working conditions to apply to all Pacific Coast yards.

CIO labor is not an important factor in West Coast shipyards, but H. A. Farmer, member of the general executive board of the Industrial Union of Marine and Shipbuilding Workers of America, said, "The CIO is going right down the line with this conference in its attempt to prevent strikes and lockouts in the shipbuilding industry."

One difficulty the meeting has faced is a lower wage scale prevailing in the Los Angeles area than on the balance of the Pacific Coast. Employers were loath to bring the Los Angeles scale up to that of the North, and northern labor representatives were adamant in their refusal to drop to the Los Angeles scale. As this was written, it appeared that a sliding

Conference promises no strikes or lockouts in shipyards... San Francisco machinists approve strike authorization. Electro Metallurgical Co. to use domestic ores in ferro chrome operation at Portland... Shipyards plot expansion... Plane builders to spend \$70,000,000 a month by midsummer.

differential would be written into the coastwide agreement.

Dr. Isador Lubin, representing the OPM, was jubilant over the "no strike-no lockout" clause and intimated that the government would recommend it to the shipbuilding industry in other sections.

"All government agencies concerned with the shipbuilding program are highly gratified at this very definite evidence of real cooperation being displayed by both labor and industry in the interest of national defense," Dr. Lubin said. "Here on the Pacific Coast, a pattern is being cut which the rest of the nation will be eager to follow."

EVEN as the conference was laying the foundation stone for a structure of shipyard labor peace, a San Francisco local union with a record of forceful independent action, was loading its siege guns to insure that none of its hard won privileges would be signed away. AFL Machinists' Union Local No. 68 includes in its membership all shipyard machinists in San Francisco, who have been enjoying double-time pay for overtime (the usual rate is time

and a half) under an agreement which was to expire April 1. In a membership vote, the union gave its negotiating committee a heavily studded club in the form of authorization to call a strike which would tie up San Francisco shipyards.

Further sanction must come from the executive board of the international union and from the Bay Cities Metal Trades Council before a strike can be officially called, and the apparent success of the coastwide conference made such approval unlikely. The past record of No. 68 would not make an unauthorized strike an impossibility, however, particularly against Bethlehem who is not a party to the coastwide conference.

Newspaper reports that Electro Metallurgical Co., subsidiary of Union Carbide & Carbon Corp., would establish a plant at Portland, Ore., for the manufacture of ferrosilicon and calcium carbide missed the most significant feature of this new industrial operation. The news which should be headlined about this new plant, which will cost more than one million dollars, is that it will also produce ferromanganese and, still more important, ferrochrome from Pacific Coast ores. Ore will come from the vicinity of Grants Pass, Ore., and Siskiyou County, Cal., just over the state boundary. The firm will contract for 35,000 kilowatts of hours Bonneville-Grand Coulee power thus becoming the third largest user after the Aluminum Co. of America and Reynolds Metal Co. Operations are expected to start about Nov. 1.

CHROME prospecting activity in Siskiyou County has been feverish since the imperiling of foreign sources by the war, with resultant price increases. During the first world war, Siskiyou County chromite production reached 6600 tons valued at \$336,000 in 1918. An unconfirmed an-

nouncement now indicates that the War Department has contracted for delivery of 75,000 tons from properties in this region in addition to production from private operations such as that which will supply the Electro Metallurgical Co. Shipments of manganese are already being made from the same area. The chrome ore, much of which is on government properties open to claim, averages from 45 to 50 per cent. Interest of the government in the Siskiyou County deposits is shown by the award of a contract by the Bureau of Mines for test drillings at Seiad Creek, near Hamburg, Cal.

Chromite has been mined commercially for some time in El Dorado County, Cal., where a concentrating plant is maintained by the Rustless Iron & Steel Corp.

Another Union Carbide subsidiary, the United States Vanadium Co., expects to place in operation shortly one of the largest tungsten mills in the world near Bishop, Cal., on the eastern slope of the Sierra Nevadas. It is reported that enough ore is blocked out at this operation to keep the 1000-ton mill operating for at least 20 years with the prospect that supplementary deposits will make possible a 75-year operation, thus helping allay fears of ore shortage because of difficulty in transporting from Chinese sources.

With the announcement by the Maritime Commission that it will favor extension of present shipbuilding plants rather than construction of new facilities, Coast yards holding contracts are surveying enlargement possibilities. Seattle-Tacoma Shipbuilding Corp. has announced that its yards at Tacoma will be doubled in size before the end of the year. Two additional ways are now being constructed to help handle the 40 million dollar Commission contract held for the Tacoma yard.

The Todd-California Shipbuilding Corp. is studying the possibility of adding four more ways to the seven now being built at Richmond, Cal., where 30 cargo ships will be built for Great Britain.

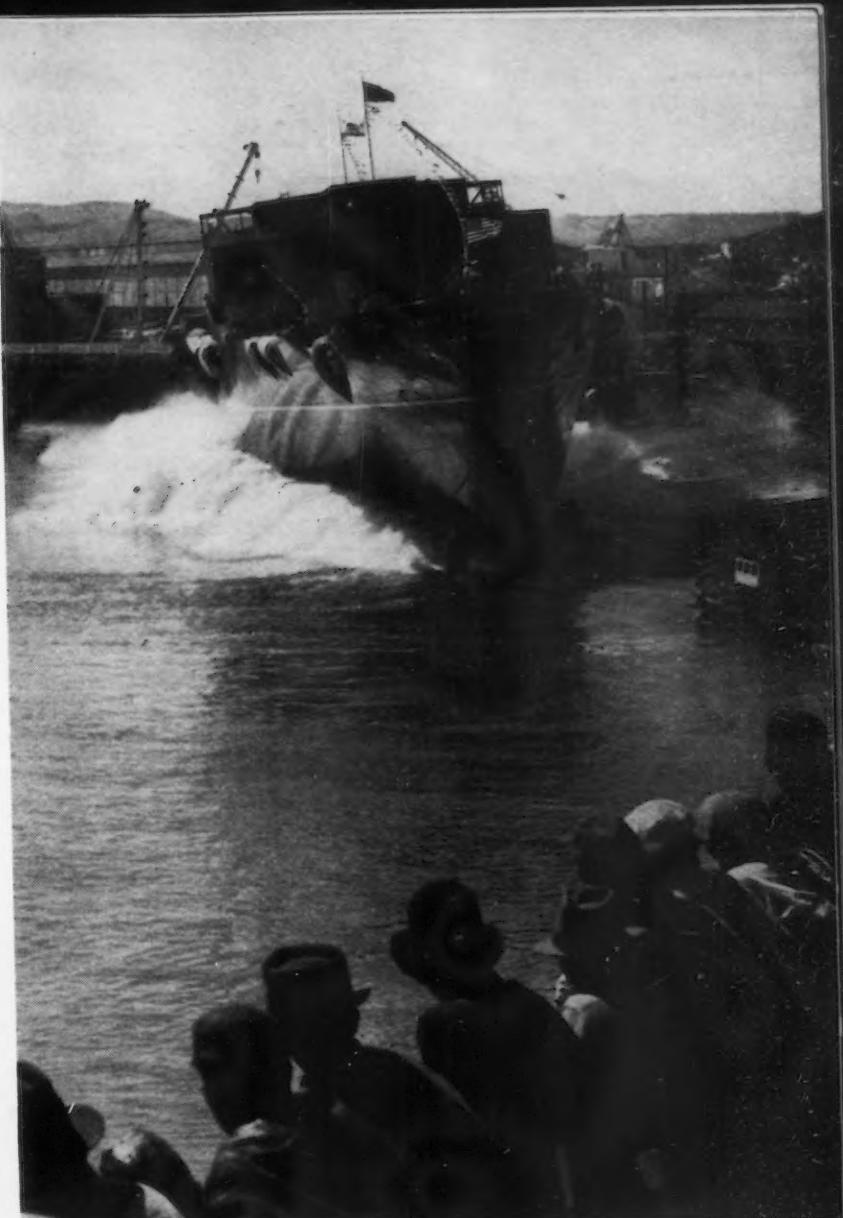
THE Maritime Commission officially confirmed last week award of 31 so-called "ugly duckling" cargo vessels to the Oregon

(CONCLUDED ON PAGE 104)

THE "AMERICAN PRESS," built under a Maritime Commission contract, is shown being side-launched at the Western Pipe & Steel Co. yards at South San Francisco, Cal.

• • •

BOMBERS ON TRACKS: Mass production is actually under way at this Douglas Aircraft Co., Santa Monica, Cal., plant where attack-bomber fuselages are shown sliding along the line on the tracks.



Fatigue Cracks

BY A.H.DIX

Draft De Luxe By Hollerith

• • • Before long you will be a punched card in the National Roster of Scientific and Specialized Personnel's steel filing cabinets. The index, now being compiled in Washington, will embrace specialists of every description, for use in the event of "all out" mobilization for defense.

Holes will be punched in your Hollerith card to indicate your experience, education, age, hobbies, marital status, and so on. It will work this way. Say Air Corps Procurement, for instance, needs an expert on deep drawing, for a southern assignment. The specifications are: five years or more experience, engineering degree, age 30 and up, hobbies: diabolo and redheads.

Into the hopper go a couple of hundred thousand cards. The proper buttons are pushed. *Whir-r-r-r*. Out pops your card, and before you know it you have an invitation for a command performance at Dayton, unless, of course, your card shows you to be insufficiently allergic to bourbon.

Glass Gem in Platinum Setting

• • • A pretty phrase we have been rolling on our tongue is one we found in the recent story on armored steel, "Quite naturally the latter is of major laic concern." The fact that we didn't know what it meant made it only the more attractive, and we are disappointed to find that it merely means "of major concern to laymen." But it is still good enough to toss off at the next meeting of the Singac, N. J., Uplift, Higher Culture and Duckpin Assn.

Candor, Chocolate-Coated

• • • A recent contributor showed us a letter he received the other day from a small arms manufacturer, reading in part:

"If articles on processing in the various trade papers came anywhere near the standard set by yours, the engineer's lot would be a much easier one in these troublous days."

Like Josh Billings, we like a man to come right out and say what he thinks when he agrees with us.

Silent Knight

• • • A Long Beach, Calif., manufacturer reports that a few months ago he was visited by a gentleman who accepted payment for an *Iron Age* subscription and gave a receipt printed "National Associated Publications." The National Associated Publishers is unknown to us; the gentleman has held himself aloof from us, and if he should call on you will hold yourself aloof from him.

Verdant Headgear Proves Worth

• • • A Milwaukee-an, ite, or er, en route to Pittsburgh, was assailed with sudden yen to see a copy of your favorite family journal while in Cleveland the other day. At 10 A. M. he telephoned our Cleveland office, and said his train left at 10:15. "We'll have a copy for you at the next stop, the E. 55th St. station," said Don James, our Cleveland editor. "What are you wearing?" The man said he had on a green hat, a black coat, and of course other things.

The copy was rushed down by taxi, and this gripping story would rise to a climactic conclusion if we could report that the taxi missed the train and chased it to Toledo. But it didn't. The green-hatted individual got his copy at E. 55th St., proving that there is at least one excuse for wearing a green hat.

Honi Soit . . .

• • • Another story we can't make much out of is one sent in by our Chicago editor, Herman Klein. A friend of his, who is an executive with a large company in the industry, recently spent a honeymoon in the South. While his wife was at the hairdresser's he got tired of dawdling around and decided to return to his hotel room. But when he returned to the hotel he found his wife had the room key. So he said to the clerk, "Have you another key for room so-and-so? I gave mine to the girl friend."

Now comes the snapper—we quote from Herman's note—"The clerk merely lifted an eyebrow, smiled quizzically and handed over a second key."

Well?

Aprononym, Piscatorial Dept.

The president of the Oceanic Sales Co., Seattle, Wash., salmon packers, is J. E. Salmon.

A. M. N., Merrill, Wisc.

Remarkable People, The . . .

A headline that stopped us like a red light is one on an ad for Desoutter electric and pneumatic tools, appearing in the English aircraft journal, *Aircraft Production*— "The nurse sort of smiled as she looked at the child." The whole advertisement is so striking that we are reproducing it here. The illustration of the baby is captioned, "Founder of the firm at an early age. (From the Desoutter Family Album)," and the text begins:

"Mr. Charles Desoutter is a modest man and it is not, therefore, possible in a Desoutter advertisement to write fully or frankly about his achievements. It can be said, however, that his parents never raised their boy to be a designer of small power-driven electric and pneumatic tools. . . . The yearning to make power-driven tools . . . filled his mind, his time and, in due course, his very small leather purse. . . ."

Our associate publication, *Boot & Shoe Recorder*, just received this letter from Charles Ager, Ltd., of Coventry:

"Please direct your future issues to our new address, 22-24 Corporation Street, Coventry. Our old address, owing to some slight petulance on the part of a man named Goering, is no longer suitable for the honorable calling of the shoe retailer. In short, it is nothing but a heap of bricks."

"At some future date our old premises will be rebuilt and our ancient city will rise again. This is our hundredth year of business and we hope that our second century will not be marred by similar events."

On page 179 of the March 13 issue Alfred Herbert, Ltd., Coventry, England, the machinery dealer, advertised for new accounts.

To paraphrase one of the tail-end verses in *The Mademoiselle from Armentieres*, the English they are a wonderful race.

Puzzles

Last week's frog made it in 18 days.

This hollow square is bounded by three groups of matches, with three matches in each group, giving a total of 9 matches on each side. Remove 4 matches, rearrange, and still leave a total of 9 on each side. Par is 15 minutes.

III III III

III III

III III III



15,000 POSTERS like this have been placed on billboards throughout the country

Critical Shortage Of Vanadium Looms If Strike Continues

• • • The seven-week old strike at the Bridgeville, Pa., works of the Vanadium Corp. of America, which was on the verge of settlement as THE IRON AGE went to press, would, if continued much longer, have created a critical shortage of vanadium. As it is, it will take the Vanadium Corp. a long time to make up for the loss of production of this vital element of steel used for the defense program.

The seriousness of the situation was demonstrated by two developments of the past week: 1. The removal of ferrovanadium stocks from the Bridgeville plant at the request of Secretary of Navy Knox and OPM Director Knudsen; 2. The certification of this strike to the National Defense Mediation Board by the U. S. Department of Labor as one of four that call for the earliest possible settlement by this newly formed government organization.

The vanadium removed from the plant was that which had been manufactured before the strike was called on Feb. 10, but which could not be shipped because of violent objections by the union. Not until the Navy and Office of Production Management cited the extreme urgency of the need for this material did the union consent to its unobstructed shipment. Some of the vanadium users who were helped out by these ship-

News of Industry

ments were running dangerously close to the bottom of their stocks.

Vanadium is an excellent example of the tail wagging the dog. Its total consumption is only an infinitesimal part of the total amount of steel produced, but it is such a vital element in high speed tool steels and in high strength constructional steels that neither the defense program nor industry generally could function efficiently without it. Moreover, shortages of nickel and tungsten have thrown an additional burden on vanadium.

Along with the changes in the major alloying elements of high speed tool steels, as from tungsten to molybdenum, there has been an increase in the proportion of vanadium used to secure maximum cutting capacity.

While one of the largest uses of vanadium is in high speed tool steels, it is also being used extensively in many of the ordnance steels being manufactured for the Army and the Navy.

Although details of the various uses of vanadium in production of various items for defense are guarded as a military secret, it is well known that it enters into almost every phase of such production—warships, airplanes, ordnance equipment and tanks. Vanadium pentoxide is largely used as a catalyst in the production of sulphuric acid, which in turn is used for nitrating operations in the manufacture of explosives. In the production of synthetic ammonia, part of which enters into the manufacture of explosives, chrome-vanadium and chrome-molybdenum-vanadium steels are used for vital parts of the equipment.

In the airplane industry such parts as propeller hubs, gears and the welded type of propeller blades are made from chrome-vanadium steel. Light armor plate for both airplanes and tanks contains a percentage of vanadium.

Manganese-vanadium plates and shapes are now being used for many types of construction work where high strength and weldability are primary requirements.

All of the Vanadium Corp. of America's production of vanadium is concentrated at its Bridgeville plant. Production figures are not available, but the National Defense Advisory Commission estimated for THE IRON AGE that output of vanadium ore (expressed as vanadium pentoxide) in the United States last year was 2,500,000 lb. and ore imports, principally from Peru, were 4,600,000 lb.

NEWS OF INDUSTRY

(Page 89, THE IRON AGE, Jan. 2, 1941).

Vanadium is produced for the market commercially in two principal forms: Ferrovanadium, which averages about 40 per cent vanadium, and vanadium pentoxide. In addition, the Vanadium Corp. of America has recently brought out a group of vanadium alloys under the trade name "Grainal," these

consisting of combinations of vanadium, titanium, aluminum and zirconium. While these new alloys are used only in amounts ranging from 2 to 5 lb. per ton of steel, they have become widely adopted to increase the hardenability of steel and to produce steels of uniform properties.

The only important producer of vanadium other than the Vanadi-

um Corp. is the Electro Metallurgical Corp., subsidiary of the Union Carbide & Carbon Corp.

The union organization responsible for the strike is CIO Industrial Union No. 953. No question of wages is involved in the dispute, which is confined solely to the issue whether the guards employed by the Vanadium Corp. to protect the plant against sabotage shall or shall not belong to the union.



Photo by International

WHIPPING UP A STRIKE: These representatives of the SWOC are shown in conference at Bethlehem, Pa., on March 24 just after they had decided that the large Bethlehem Steel Co. plant, vital to U. S. defense, should be struck. Howard Curtiss, regional SWOC director, is the second from left, seated.



Photo by International

ALL-OUT: A striker at the main gate of Bethlehem Steel Co.'s Bethlehem plant calls upon defense workers to leave their jobs and join the strike. If enough steel workmen took this man's advice, the U. S. defense program would be hard hit.

Italy Plans to Build New Vanadium Plant

Washington

• • • The Italian Metallic Metals Administration, a government-controlled organization, is reported planning to construct a new plant at Serra Ricco, near Genoa, for production of vanadium, according to the Metals and Minerals Division, U. S. Department of Commerce.

In Italy, vanadium is recovered from naphtha ashes, the ashes being collected in ports and industrial establishments and shipped to the processing plant of the Metals Administration at Rivarolo-Genoa. According to the latest available information, 974 metric tons of naphtha ashes were treated at this plant during the period July, 1938-June, 1939, yielding a total of approximately 50 metric tons of vanadium pentoxide. Indications are that the new plant will have a daily production capacity of 120 kg. (264 lb.).

Coming Events

- April 16 to 18—Electrochemical Society, Inc., spring meeting, Cleveland.
- April 23 to 25—Concrete Reinforcing Steel Institute, annual meeting, Hot Springs, Va.
- April 23 to 25—Open Hearth and Blast Furnace Committees, American Institute of Mining and Metallurgical Engineers, annual meeting, Chicago.
- April 28 to 29—American Zinc Institute, annual meeting, St. Louis.
- May 1 to 2—The Galvanizers Committee, annual spring meeting, Pittsburgh.
- May 8 to 9—National Metal Trades Association, annual convention, Chicago.

Defense Board Sees More Planning Needed

Washington

• • • The National Defense Advisory Commission, whose policy-making function in locating defense plant sites has been superseded by the OPM's Plant Site Committee, has laid before the Office of Production Management four principles designed to promote greater efficiency in building defense production facilities, more industrial decentralization,

The Little Man

who wants to work

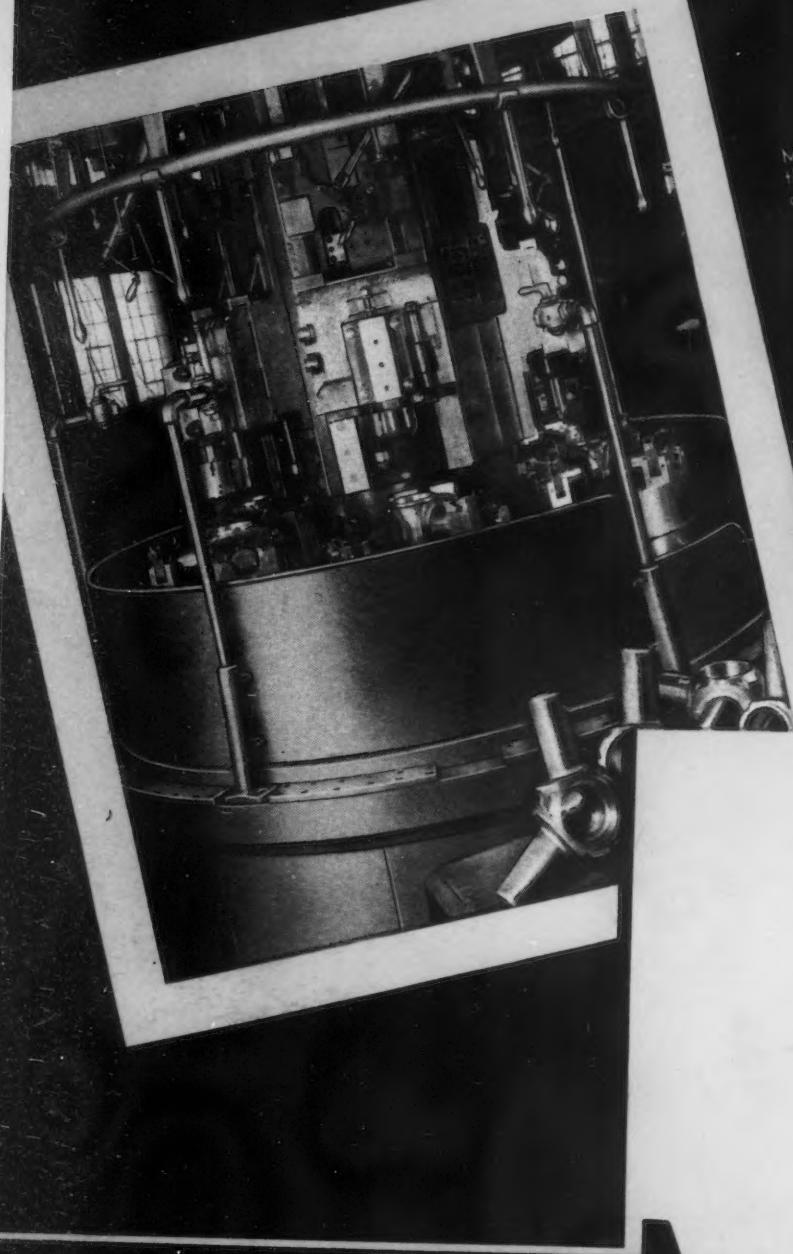
EUGENE SHELTON (with friend) last week was on his way to his job in the struck International Harvester Co. plant at Chicago. The marks on his face are not defects in the photograph. They were left, Shelton said, by CIO pickets.

and the long-range objective of planning for a balanced industrial economy.

The commission made a statement of policy in which it recommended the avoidance of cities or regions where defense orders show signs of absorbing available labor supply, or congesting housing, transportation or other facilities; it likewise urged that preference be given to locations with large reserves of unemployed or where industrialization will contribute to more balance between industry and agriculture; that special attention be given to sections which have suffered decline in peacetime industries; and that a wider distribution of defense contracts and an aggressive policy to promote more sub-contracting of defense orders be developed.

It was also suggested that the new committee be given a technical staff to study in detail proposed defense locations and work closely with the Army and Navy; that a systematic review of complete War and Navy Department plans for new facilities be undertaken to develop a broad policy of decentralization; and that it be empowered to recommend specific locations for different types of defense production.



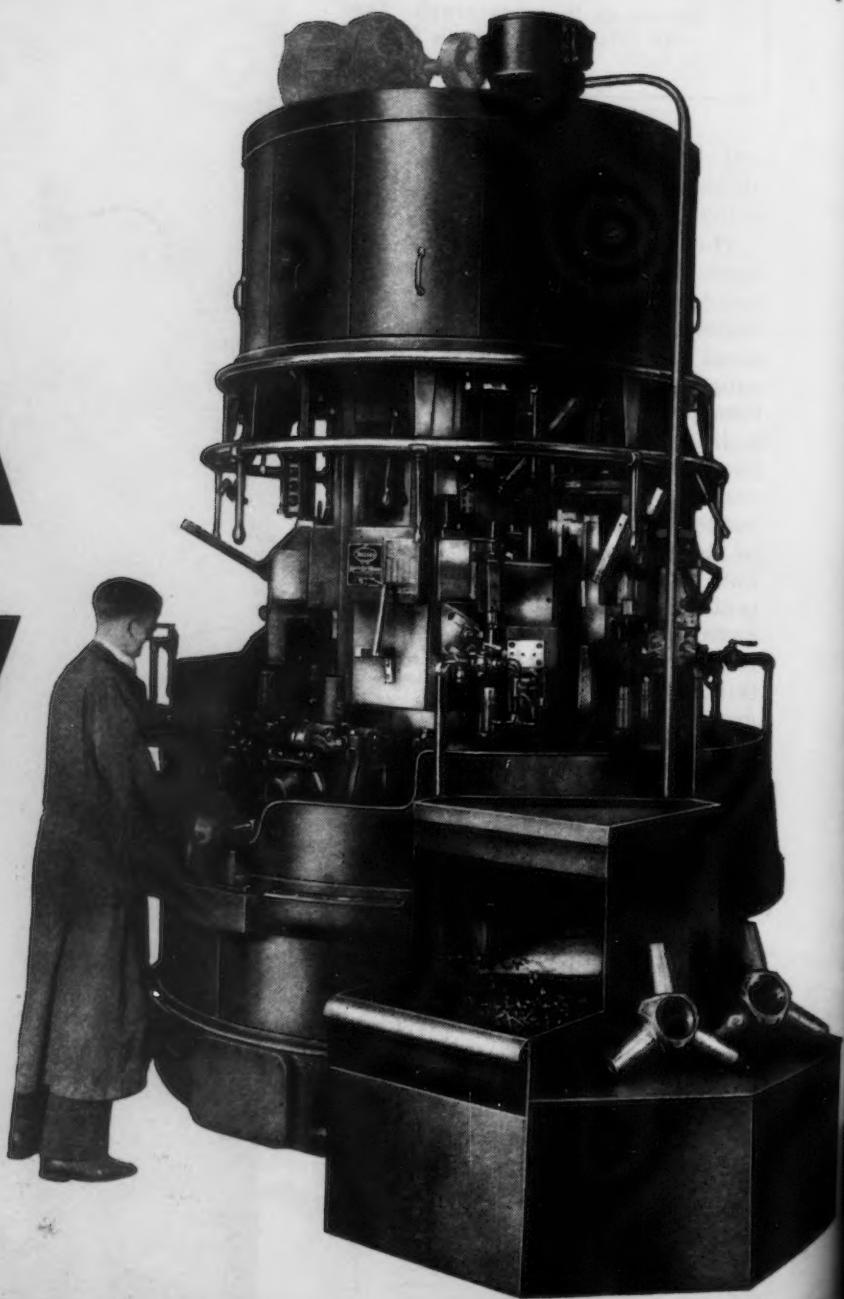


Old Time 96 Minutes

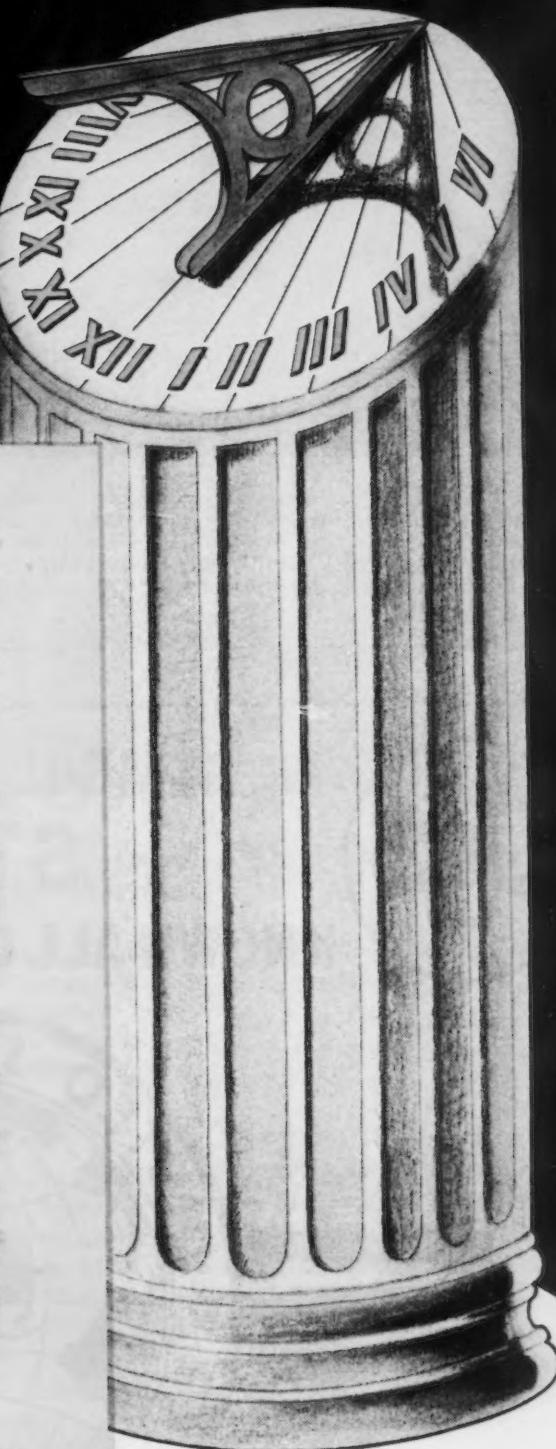
Mult-Au-Matic Time 6 Minutes

SAVED 90 Minutes

Multi-Au-Matic toolled for
the operation mentioned,
on the opposite page.



'TIME... said Ben Franklin IS MONEY'

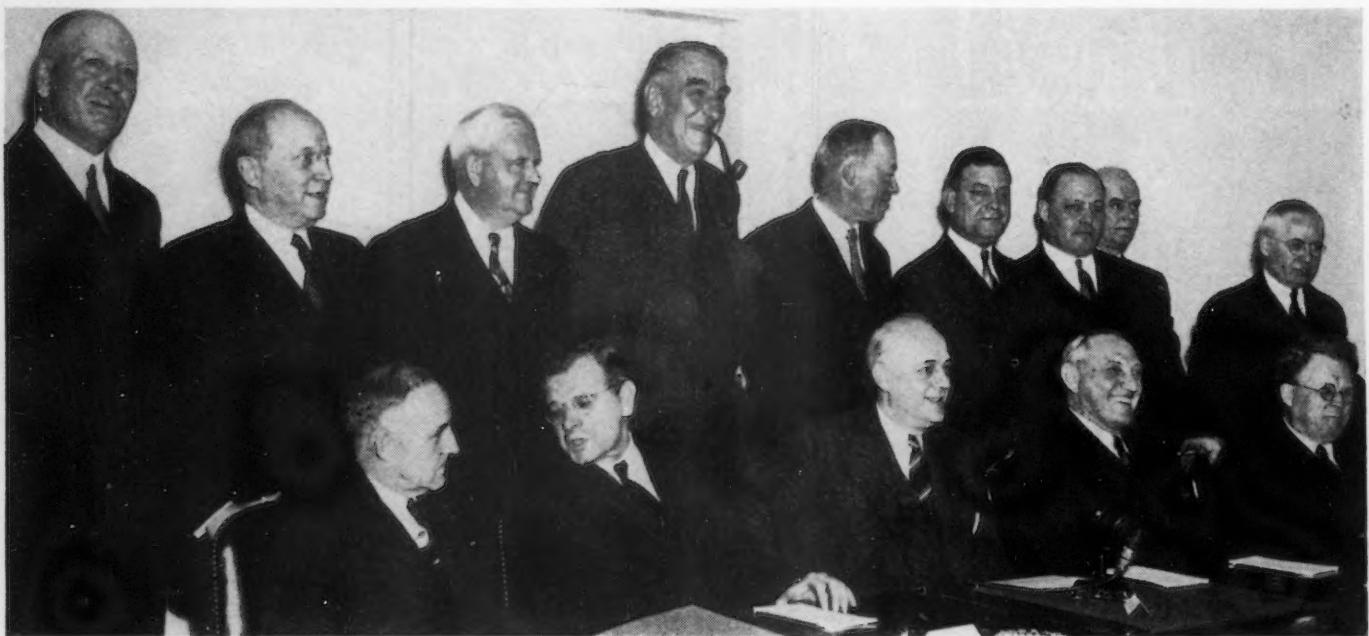


Time is more than money today — perhaps it's our very national life! So it is important to see just what makes Bullard Mult-Au-Matics such important time-saving tools.

The answer is the **Mult-Au-Matic Method**—a method by which the necessary machining of any given part is distributed among a considerable number of cutting tools and performed simultaneously. By multiple tooling on each of the five or seven working spindles, often 30 or more operations are performed simultaneously in the time taken by the longest single one, plus a few seconds for indexing. One example will illustrate: By using a Mult-Au-Matic, the machining time for an aeroplane propeller spider was cut from 96 minutes to 6 minutes. What more clearly shows the value of the Mult-Au-Matic method?

Bullard Engineers will gladly explain the application of the Mult-Au-Matic method to your production problems.

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT



ON THE FIRING LINE: Members of the new National Defense Mediation Board on March 24 held their first meeting as strikes crippled some defense plants and threatened others. Left to right are (seated): Dr. Frank Graham, Sidney Hillman, OPM associate director; Clarence Dykstra, chairman, Daniel W. Tracy and William H. Davis. Standing, l. to r., are Charles V. McLaughlin, Eugene Meyer, Roger D. Lapham, Cyrus Ching, Walter Teagle, George M. Harrison, George Meany, Philip Murray, CIO and SWOC chairman, and Thomas Kennedy.

**A SYMBOL OF QUALITY IN
STEEL
KNOWN ALL OVER THE WORLD**



30 CHURCH STREET, NEW YORK, U. S. A.

You Pay the Same for Power--Delivered or Dissipated!



"They Have Taken Some Hard Knocks in Ten Years"

... says Mr. Graham

In the Simmons' Co., bed manufacturing plant, at San Francisco, California — a Lewis Rail Breaker severs heavy steel rails for use in the steel mill. This rail conveyor is equipped with Dodge-Timken Clamp Sleeve Pillow Blocks, which replaced babbitted bearings ten years ago. Mr. W. H. Graham, superintendent of Simmons Co. Rolling Mill, San Francisco, discusses Dodge-Timken Pillow Blocks with Mr. L. M. Bullock of Horsford Bros. Co., Dodge San Francisco Distributor.

Mr. Graham: Absolutely — these Dodge-Timken Bearings are 10 years old — and none have been replaced — in spite of their exposure to dust, dirt and other elements.

Mr. Bullock: Well, that's fine — but did you effect any other savings?

Mr. Graham: Yes — your bearings replace man power formerly required to move the rails along the conveyor. You see, this conveyor can now handle the heaviest rails with ease — a job impossible without rolling bearings.

Mr. Bullock: How about the loads? Are they always heavy?

Mr. Graham: These bearings must withstand heavy shock loads imposed by falling rails — and yet must roll easily . . . and Dodge is doing exactly that.

There is a Dodge Rolling Bearing for every industrial service — each one designed for a life expectancy of 30,000 hours under conditions for which they are adapted. Write for selection tables which make it easy to pick the right bearing for any job.

DODGE MANUFACTURING CORPORATION
MISHAWAKA, INDIANA, U.S.A.

THE RIGHT DRIVE



FOR EVERY JOB

Chicago Defense Jobs Top Billion

Chicago

• • • More than \$2,132,000,000 in defense contracts has already been placed in the Chicago Federal Reserve District, more than a billion in the Chicago area alone. This was revealed to regional officials of five Federal Reserve districts by Robert L. Mehornay, chief of defense contract service of the OPM. Mehornay said that \$276,000,000 in ordnance contracts have been placed in the Chicago district alone, compared to an average yearly expenditure of \$25,000,000 for the last 20 years in the whole country.

Mehornay stated that every manufacturer with the facilities to help in the program would be financed, with the Federal Reserve providing financing to the extent of \$690,000,000 and the army furnishing additional \$450,000,000.

8082 Working At Rock Island Arsenal

Rock Island, Ill.

• • • Employment at the Arsenal here has topped 8000 for the first time since the last World War. The total employment figure in mid-March was 8082.

The defense contract head explained that 36 regional offices will be established in Federal Reserve banks and branches to help in this financing.

Francis J. Trecker, chief of subcontracting of the defense contract service, told the same meeting that primary contractors could not expect a normal profit on subcontracts since they did not have the overhead or production problems. They should be content with a royalty.

Defense Orders for Structural Steel Slacken

• • • Orders for fabricated structural steel booked in February totaled 159,815 tons, compared with 266,594 tons in January, according to reports received by the American Institute of Steel Construction. The new business was in a volume approximately equal to the shipments of the industry during the same month, indicating that defense orders are slackening.

The industry fabricated and shipped during February 146,642 tons, which is approximately 65 per cent of the tonnage shipped during the basic period 1923 to 1925 inclusive. The tonnage fabricated during the month was slightly higher, but shipments were delayed because job sites were not ready to receive the steel.

The industry has on hand, available for fabrication within the next four months, a total of 624,201 tons.

OUR apologies to those who have been disappointed on delivery due to unforeseen circumstances and our assurance that we are bending every effort twenty-four hours a day, to maintain delivery promises.

Constantly *improved methods, increased efficiency, and prompt personal attention assure you of our dependability as your source of supply.*



Steel Wire

Aircraft Wire

Armature Binding Wire

Bicycle Spoke Wire

Bobby Pin Wire

Bookbinder Wire

Bronze Plated Wire

Brush Wire

Car Seal Wire

Card Wire

Casing Wire

Curtain Spring Wire

Flat Wire

Flexible Shaft Wire

Fish Leader Wire

Hard Drawn Spring Wire

Half Round Wire

Hose Reinforcement Wire

Lock Spring Wire

Music Wire

Rope Wire

Scratch Brush Wire

Shaped Wire

Signal Corps Wire

Spoke Wire

Spring Wire

Tire Bead Wire

Tempered Wire

Valve Spring Wire

JOHNSON STEEL & WIRE CO., INC.

MAIN OFFICE AND PLANT • WORCESTER, MASSACHUSETTS
Branch Plants and Warehouses: AKRON, OHIO; LOS ANGELES, CALIF.



● One of the greatest helps to designers, is complete and up-to-date information on gearing. That is why Phillie Gear puts such a wealth of material in this catalog . . . It is virtually a text book on gearing.

Further, our broad experience in problems concerning the transmission of power, gained in 50 years of specialization in this line, will oftentimes enable us to offer recommendations helpful to the design engineer.

Needless to say, Philadelphia Gears are of the high quality that spells success in operation.

Always keep a copy of the Philadelphia Gear Book on the boards. It gives facts and figures about our complete line of gears, which are made in all types, sizes and materials.

PHILADELPHIA GEAR WORKS



Industrial Gears and Speed Reducers
Erie Ave. and G St.

Philadelphia, Pa.

*
New York • Pittsburgh • Chicago

Japan Steel Co. to Seek German Tools

Washington

• • • The Machinery Division, Department of Commerce, reports that construction of a new machine tool plant at the works of the Japan Steel Co. at Tobata is being pushed with all possible speed. Most of the machinery for the project is expected to be on

hand by the end of March. Some of the large machine tools probably will be imported from Germany, according to press reports, instead of from the United States as originally planned. It is reported that the new plant will be capable of manufacturing machine tools of any size in sufficient quantity to obviate Japan's dependence on foreign sources for such items.



Therm-O-flake

Therm-O-flake COATING

SUPERIOR HIGH TEMPERATURE INSULATION

Keeps heat inside, with a coating of plastic insulation. One inch thickness equivalent to about nine inches of fire brick wall in insulation value.

More economical in cost and installation, on existing furnaces, than walls of insulation brick.

Easily applied and largely reclaimable for re-use, after removal.

Most widely used material for high temperature insulation, up to 2000°F.

•

Write for Information and Prices

Other Therm-O-flake Products

Made from Exfoliated Vermiculite

Granules, Brick, Block, Concrete

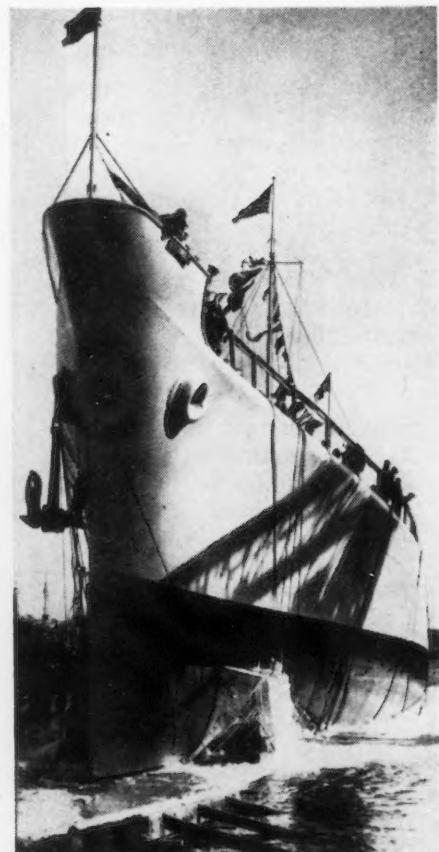


Photo by Wide World

NEW TYPE SEAPLANE TENDER: First of 16 new type Naval seaplane tenders, this vessel is shown as it went down the ways at the Boston Navy Yard. The ships will act as tenders for the large naval patrol bombers.

National Bearing Metals Corp. To Enlarge Plant 30%

Chicago

• • • National Bearing Metals Corp. will add about 5200 sq. ft. to its plant which will provide about 30 per cent more area. It is said that additional furnace capacity will also be added. Company makes brass and bronze alloy castings.

16,406 Hired in Illinois

Springfield, Ill.

• • • Total of 16,406 jobs were filled in February by Illinois State Employment Service compared to 10,190 for the same month in 1940. The Federal government has asked Illinois firms to hire their employees through the service to prevent migration of labor from the state.



PAYLOAD PRODUCTION

with

SALEM SPECIALIZED

Equipment

SHELL FORGING & HEAT TREATING
PLANTS

CARTRIDGE CASE PLANTS

ARMOR PLATE CARBURIZING EQUIPMENT

GUN PLANTS

GAS, OIL OR CONVECTION
HEATED EQUIPMENT

SALEM'S COMPACT BUT HIGHLY
EFFICIENT EQUIPMENT HAS LONG
DEMONSTRATED ITS FLEXIBILITY OF
PERFORMANCE AND ECONOMY OF
OPERATION

SALEM ENGINEERING CO. SALEM, OHIO DEPT. M.



**Rail Rate Cut on
Steel Products Denied**

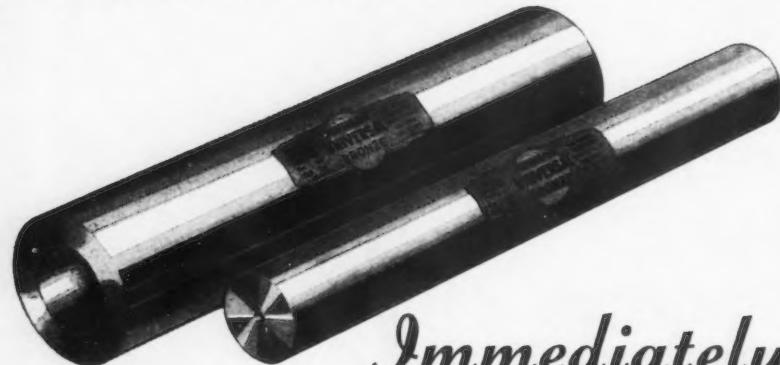
Washington

• • • Declaring that the relief sought "would not tend to foster sound economic conditions among the several carriers and would not be in accord with the national transportation policy," Examiner Andrew C. Wilkins has recommended that the Interstate Com-

merce Commission deny the application of railroads to reduce rates on iron and steel products in car-loads from points in official and southern territories and from certain points in western territory to Gulf ports. The reductions were proposed through relief from the long-and-short-haul clause. The reduced rates, to be subject to a minimum of 70,000 lb., were to apply to only 73 products, though

they cover a wide range of principal products of the industry but excluded some important tonnage such as tin plate. Present rates are subject to a minimum of 36,000 lb. and apply on 236 products.

**TONS
of Johnson Quality
UNIVERSAL BRONZE BARS**



*Immediately
from STOCK*

One bar . . . a hundred bars . . . or tons of bars . . . right off the shelf into your shop with no delay. Over 350 sizes—cored and solid—enables you to order exactly to your requirements. Complete machining—inside diameter—outside diameter—ends—saves you time, tools and purchase weight; protects you against hidden defects.

And it's quality bronze tool! Cast in S.A.E. 64—the best general purpose bearing bronze available. Try this remarkable service on your next order. Complete stocks are carried in every industrial center. Give us an opportunity to prove our exceptional service. UNIVERSAL Bronze will prove its quality through performance.

CARRIED IN STOCK BY YOUR LOCAL DISTRIBUTOR

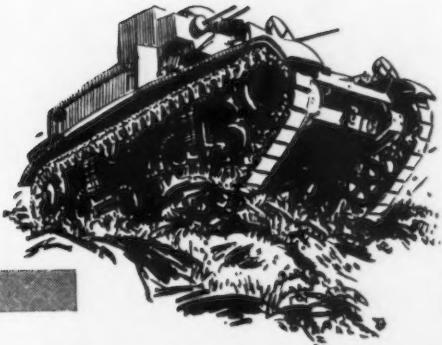


JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS
505 S. MILL STREET • NEW CASTLE, PA.

AWARDS TO FOUNDRYMEN: Four gold medals will be awarded at the American Foundrymen's Association annual convention in New York May 12 to 15 to four men making outstanding contributions to the foundry industry. They are, top to bottom, Charles Edgar Hoyt, executive vice-president, American Foundrymen's Association; Donald J. Reese, International Nickel Co.; Max Kuniansky, Lynchburg Foundry Co., and Fred L. Wolf, Ohio Brass Co.





THERE MUST BE NO "PRODUCTION KINKS"

ARCOS has prepared itself for
the "all-out" defense program.

 **ARCOS CORPORATION**
401 N. Broad St., Phila., Pa.



"QUALITY WELD METAL EASILY DEPOSITED"

Distributors Warehouse Stocks in the Following Cities:

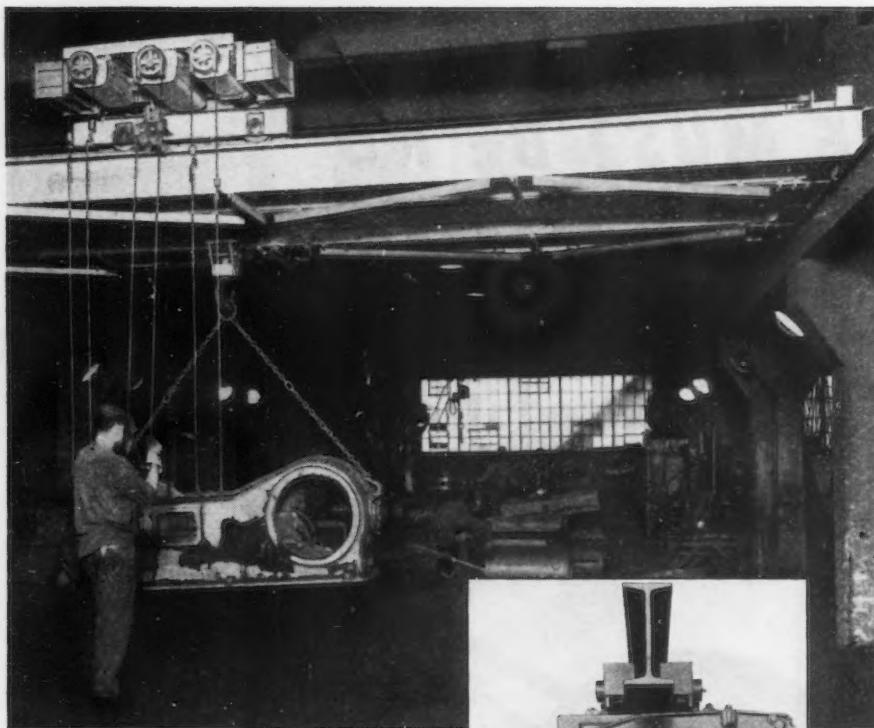
ATLANTA, GA.	J. M. Tull Metal & Supply Co.	KANSAS CITY, MO.	Welders Supply & Repair Co.
BUFFALO, N.Y.	Root, Neal & Co.	KINGSPORT, TENN.	Slip-Not Belting Corp.
BORGER, TEXAS	Hart Industrial Supply Co.	LOS ANGELES, CALIF.	Ducommun Metals & Supply Co.
BOSTON, MASS. (Belmont)	H. Boker & Co., Inc.; W. E. Fluke	MILWAUKEE, WIS.	Machinery & Welder Corp.
CHICAGO, ILL.	Machinery & Welder Corp.	MOLINE, ILL.	Machinery & Welder Corp.
CINCINNATI, OHIO	Williams & Co., Inc.	NEW YORK, N.Y.	H. Boker & Co., Inc.
CLEVELAND, OHIO	Williams & Co., Inc.	OKLAHOMA CITY, OKLA.	Hart Industrial Supply Co.
COLUMBUS, OHIO	Williams & Co., Inc.	PAMPA, TEXAS	Hart Industrial Supply Co.
DETROIT, MICHIGAN	C. E. Phillips & Co., Inc.	PITTSBURGH, PA.	Williams & Co., Inc.
ERIE, PENNA.	Boyd Welding Co.	PORTRLAND, OREGON	Industrial Specialties Co.
FT. WAYNE, IND.	Wayne Welding Supply Co., Inc.	SAN FRANCISCO, CALIF.	Ducommun Metals & Supply Co.
HONOLULU, HAWAII	Hawaiian Gas Products, Ltd.	SEATTLE, WASH.	H. A. Cheever Co.
HOUSTON, TEXAS	Champion Rivet Co. of Texas	ST. LOUIS, MO.	Machinery & Welder Corp.
INDIANAPOLIS, IND.	Allied Weld-Craft, Inc.	TOLEDO, OHIO	Williams & Co., Inc.

STEEL

FROM TRACK TO HOOK

JILL

R & M Hoists and Cranes



Above, R & M hoist and crane handling heavy castings in leading machine plant. At right, 2000-lb. capacity R & M electric hoist, "steel-built" from track to hook. One of the many R & M hoists, up to 15,000-lb. capacity; push-button control, wide choice of speeds, low headroom.



WITH an R & M hoist and crane overhead you have a power plant of steel from track to hook that gives you complete mastery of material handling. One man can gently "inch" down large castings or spot an ingot on a dime . . . and save you time and money with every move.

R & M hoists and cranes are built by a house that has done nothing but quality-building since 1878. They are expensively built—to save you not just a few dollars at first, but thousands later through

super-efficient operation . . . without crack-ups to wreck urgent production schedules.

R & M offers two thousand different types of hoists and cranes as a *profitable* solution for your plant set-up. And if none of these fits the job, we'll build one that *does*.

Telephone our nearest sales and service office now for competent, experienced engineering advice. Whatever your hoist and crane problem may be . . . it will pay you to "take it up" with R & M.

ROBBINS & MYERS, Inc.
 HOIST & CRANE DIVISION • SPRINGFIELD, OHIO
 MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

Harvester Strike Hits Sivyer Casting Plans

Chicago

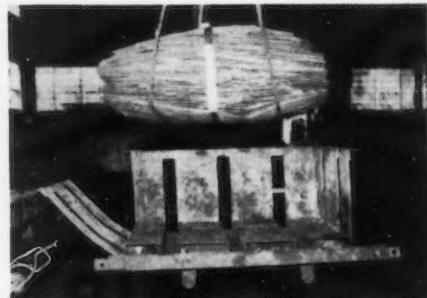
• • • One shift was laid off by Sivyer Steel Casting Co. due to slow-down in operations caused by the strike at International Harvester. Harvester is a leading customer of Sivyer for its carbon steel castings. Two shifts are now operating and the third will again be put back as soon as the Harvester strike is settled.

Columbia Steel Co. Adds Electric Furnace

San Francisco

• • • Columbia Steel Co. has announced that it will add a standard type Heroult electric furnace to its foundry department at the Pittsburg, California, plant. The size of the furnace was not announced because of defense restrictions.

The new furnace will supplement the existing open hearth melting facilities and for the present will be principally engaged in casting national defense orders requiring special steel composition. Completion of installation is scheduled by April 1.



NEW SCRAP BOX: Amercian Rolling Mill Co. has developed this new, collapsible scrap box, slotted in the bottom for hoisting by chains. Sides and ends are joined with easy-to-remove pins.

500 Will Attend A.I.S.E. Conference

Youngstown

• • • More than 500 steel mill executives and operating engineers are expected to attend the annual spring conference of the Association of Iron and Steel Engineers which will be held in the Ohio Hotel, Youngstown, April 28. At 9:30 a. m. the technical sessions will be opened by J. L. Miller, chief combustion engineer, Republic Steel Corp., Cleveland, who will preside as chairman. He will be assisted by L. N. McDonald, Jr., chief power and fuel engineer, Carnegie-Illinois Steel Corp., Youngstown. The first of two papers, "Stoker Applications for Combination Firing of Boilers," will be presented by Otto de Lorenzi, Combustion Engineering Co., Inc., New York, and the second morning paper, "Maintenance of Instruments and Control in the Steel Plant," will be offered by A. E. Krogh, Brown Instrument Co., Philadelphia.

At 1:30 p. m. an inspection trip will be made to the Sharon works of the Sharon Steel Corp., Sharon, Pa. Buses will transport the steel mill executives and engineers to the plant, leaving the Ohio Hotel promptly at 1:30 p. m.

At 6:30 p. m., a dinner will be held in the ball room of the hotel and will be followed by another session at 8 p. m. Stanley Grand-Girard, superintendent of maintenance, Sharon Steel Corp., will be chairman. A paper entitled "Grounded Direct Current Systems for Steel Mills," will be presented by H. A. Travers and L. L. Fountain, power system engineers, Westinghouse Electric & Mfg. Co., East Pittsburgh. A second paper entitled "Operating Problems in Bar Mills" will be given by W. H. Bennett, superintendent, Gautier division of Bethlehem Steel Co., Johnstown, Pa.

National Tube Clerical Workers Form Union

Lorain, Ohio

• • • A new local union for white collar workers of National Tube Co. here has been established by the S.W.O.C. with John G. Glasgow as president.



defend YOUR BUILDINGS
AGAINST FIRE AND WEATHER...

★ Cut Maintenance
To The Bone With

Carey
ASBESTOS AND ASPHALT

INDUSTRIAL PRODUCTS

CLEAR the decks for the main job — PRODUCTION.

You can't afford at this time to be hampered by costly upkeep and inefficiency, either in buildings or equipment.

When you buy materials, buy on the basis of known performance, minimum yearly cost and maintenance. You get these definite results when you improve with CAREY materials.

CAREY Industrial Products cut costs from foundation to roof. They offer permanent protection against fire and weather . . . reduce heat losses . . . save fuel . . . prevent dampness . . . improve air conditioning . . . minimize maintenance.

CAREY materials are the development of over sixty years of manufacturing experience backed by extensive modern research and proving in the service of industry. Their use is insurance against costly experimentation. Write for new book—"Proved Protection Against Wasted Profits"—address Dept. 26.



THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio

Dependable Products Since 1873
IN CANADA: THE PHILIP CAREY COMPANY, LTD. Office and Factory: LENNOXVILLE, P. Q.

OPM Priorities On Machinery Expand

Washington

• • • The OPM priorities division last week expanded the mandatory priorities control imposed on machine tools on Feb. 24 by directing producers to fill all Army, Navy and British defense orders first and by assigning all such orders

a preference rating of A-10. At the same time the division assigned to an undisclosed number of machine tool builders a limited blanket preference rating of A-1-a for the acquisition of eleven specifically named items including bars, forgings, castings and tubes of alloy steel; iron, steel and aluminum castings; cutting tools and abrasives; and machine parts and equipment.

Specifically, in tightening controls over the distribution of completed machine tools, the division ordered producers to fill Army, Navy and British orders first and to assign such orders a preference rating of A-10 except when superior ratings may be issued. The division also instructed tool builders not to make any non-defense deliveries except in accordance with specific releases which may be provided from time to time by the priorities division.

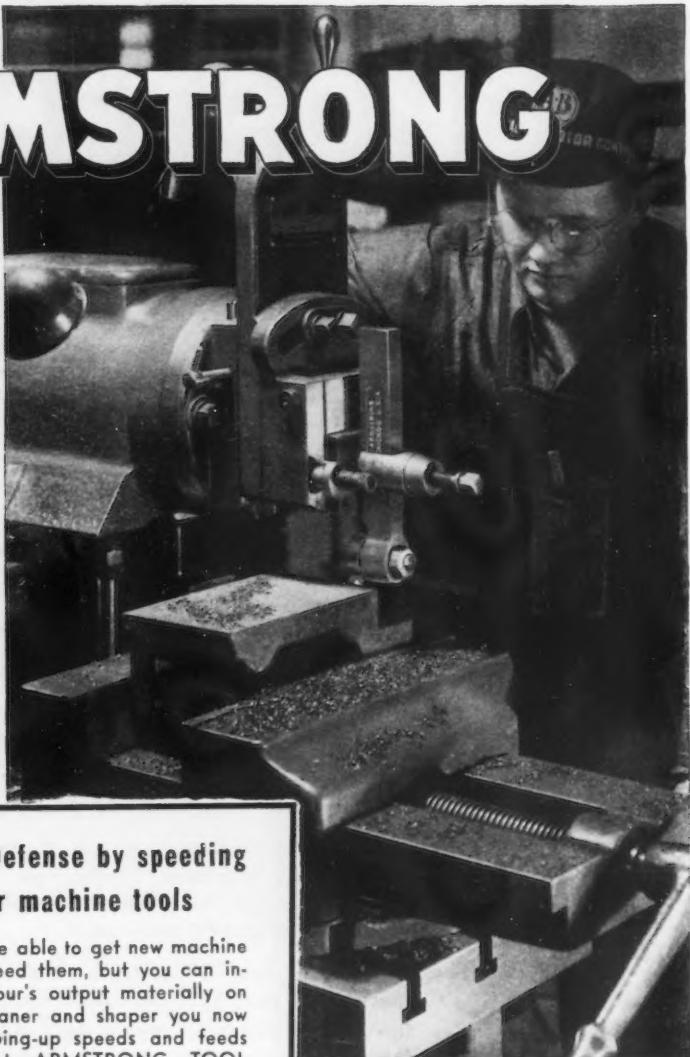
The order affecting the distribution of completed machine tools also required the maintenance of certain described records containing information deemed necessary for the proper administration and enforcement of the priorities system. Information previously requested by the production division will continue to be supplied for the present, officials said.

The limited blanket preference rating, photostat copies of which can be turned over to suppliers in its application, is similar to one issued on Mar. 13 for electric traveling cranes and must be agreed to in writing before it becomes effective as to any tool builder. To supersede the former machine tool blanket rating, which expired on March 31, the new blanket rating covers these designated products:

Machine tools, consisting of power driven metal working machines, hydraulic and mechanical presses and welders; cranes and hoists; motors and other electrical equipment; alloy steels in bars, forgings, castings and tubes; iron, steel, and aluminum castings; machine parts and equipment; cutting tools, including cemented carbides; abrasives; measuring instruments and gages; brass, copper and steel tubing and fittings; and oil resisting hose.

It was emphasized that other material may be added to the list from time to time but that until such additions are made the rating cannot be applied to materials not named in the order. The policy with respect to the limited blanket priority ratings, as announced on March 12 when the first rating blanket rating was made applicable to nine crane builders, and as confirmed last week with the issuance of the new order, is to rely on such ratings only in cases of "special urgency."

ARMSTRONG



Speed up Defense by speeding up your machine tools

You may not be able to get new machine tools as you need them, but you can increase each hour's output materially on every lathe, planer and shaper you now have by stepping-up speeds and feeds with the right ARMSTRONG TOOL HOLDER.

With the correct ARMSTRONG TOOL HOLDER for each operation, you can machine steel efficiently and safely at cutting speeds far beyond those considered "Standard"—speeds limited only by the pulling power of the machine tool.

There are tool holders of over 200 sizes and shapes in the Armstrong System. Each is a permanent multi-purpose tool that eliminates "tool dressing" and "Saves: All Forging, 70% Grinding and 90% High Speed Steel," that take cutters any mechanic can quickly grind from stock shapes of high speed steel.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

309 N. Francisco Ave., Chicago, U. S. A.

Eastern Warehouse and Sales: 199 Lafayette St., New York





SPECIAL TREATMENT under close supervision assures railroad car wheels with uniformly improved properties throughout the rim, plate and hub. Here is a wheel being "oil conditioned" by a full oil quench during American Rolling Mill Co.'s exclusive heat treating process.

Empire Earnings \$41,951

• • • Empire Sheet & Tin Plate Co., Mansfield, Ohio, reports 1940 net profit of \$41,951, compared with a \$39,141 net the previous year. President James M. Hill said sales of \$6,025,698 last year were 21 per cent ahead of 1939. The company's employment is at a high mark, with more than 1200 on the payroll.

9 New Defense Plants Started at Chicago

Chicago

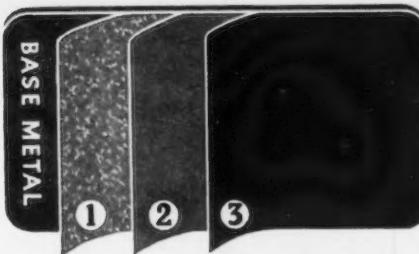
• • • Nine new armament plants—at a cost of more than \$5,000,000—were started in this area during February and March. All received OPM certificates of necessity. Firms involved are Miehle Printing Press & Mfg. Co., making machine tools, gunsights and gun

mounts; American Steel Foundries, Indiana Harbor and Hammond, Ind., for tank components; Foote Bros. Gear & Machine Corp., aircraft engine gears; Danly Machine Specialties Co., Independent Pneumatic Tool Co., United Drill & Tool Corp., Illinois Tool Works and Clearing Machine Corp. In the first quarter of 1941, six new plants and 121 plant additions were undertaken.

FORM IT, DRAW IT, PAINT IT! ZINC CLINGS TO THIS METAL

• Have you ever wanted to give your formed and painted metal products a protective zinc coating, but didn't—all because ordinary coatings peel off when formed, and "make ready" for painting costs too much?

Then consider how ARMCO ZINCGRIP-PAINTGRIP sheets or coils can open a new sales field for you with this 3-way protection:



1. ARMCO ZINCGRIP: A revolutionary new zinc coating under

2. ARMCO PAINTGRIP: A smooth, special bonderized finish that insulates the zinc from

3. Paint or Enamel. These can be applied in *any* shade of any color.

Bend it, form it or draw it! The tightly adherent ZINCGRIP coating



stays on. No flaking, no peeling of the zinc. Corners and seams are protected as well as the flat parts.

Next the bonderized ARMCO PAINTGRIP is ready to be finished. The



metal needs no etching to take paint. It *preserves* paint, keeps it smooth and beautiful longer.

Would *your* products be more salable made of ARMCO ZINCGRIP-PAINTGRIP sheets or coils? Write for a working sample. The American Rolling Mill Company, 1330 Curtis Street, Middletown, Ohio.

ARMCO ZINCGRIP-PAINTGRIP



This paper plant was using a skid and truck system for handling paper flats. It was entirely satisfactory until the plant's business jumped. Then limitations in stack heights forced overcrowding of floor space; made it increasingly difficult to quickly make up rush orders. Extension of the storage bay was contemplated.

Reading suggested the illustrated monorail and electric hoist installation, to take advantage of the free space above the stacks. Skids were still fully utilized for short hauls and temporary storage. Long hauls to loading platforms were handled by the hoists. Plans for new building were abandoned, faster handling assured.

Write Reading for time and money-saving overhead handling ideas. The equipment is tops, too.

READING CHAIN & BLOCK CORP.
DEPT. 24
READING, PA.

READING

Chain Hoists, Electric Hoists,
Cranes and Monorails

Ickes Complains

Allis Strike Holds Up 5 Power Projects

Washington

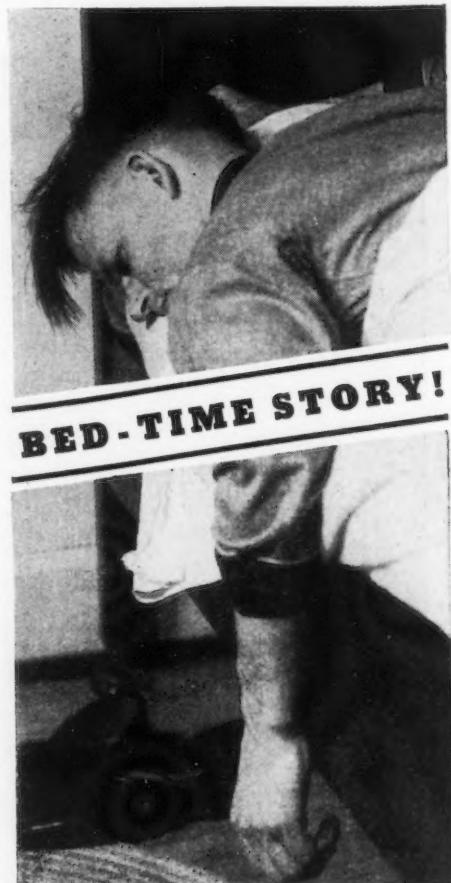
• • • Secretary of the Interior Harold L. Ickes made public last Friday a remarkable statement showing how five big western power projects to be used for supplying hydroelectric energy to defense plants were held up by the Allis-Chalmers strike.

The spectacle of a representative of a powerful government merely complaining bitterly rather than demanding that work be resumed at once is not an edifying one for Mr. Ickes presented a documented case, based on reports of Department engineers, which disclosed that long ago drastic action should have been taken to avoid the widespread stoppage of defense work that has been caused by the strike.

The Allis-Chalmers Corp., the statement points out, has contracts for power equipment for the Bonneville, Shasta, Boulder, Parker and Colorado-Big Thompson projects. Both Bonneville and Boulder dams are now producing power for defense industries and heavy demands have piled up for increased output. Materials dependent upon this power include aluminum, chemicals, aircraft, ships and "other implements and products."

Issued almost simultaneously with the rejected urgent request of Secretary of the Navy Knox and OPM Director Knudsen, the statement said that continued failure to work on the power equipment in the Allis-Chalmers plant would upset stepped-up power schedules and throw the effects of this stoppage into essential industries on the Pacific Coast and in the northwest, which, it was stated, was not affected "at the present moment."

"The nation is dependent upon plants in the affected area for drastically needed aluminum and other metals, for Douglas, Boeing, Consolidated, Lockheed, Northrup and other aircraft; for shipbuilding in Tacoma and Seattle and elsewhere, and for the general production of defense material," the statement said.



"Springs is Springs"

the persuasive salesman said,
but here's how the foreman looked in bed . . . worried all day
and worried all night, that batch of springs was far from right . . .
those pennies saved in the price
of springs had brought in troubles as though on wings . . . he's
asleep at last with a bedtime
decision . . . he knows he can
count on Cuyahoga's precision.

**COIL SPRINGS OF ALL KINDS
FLAT & ROUND WIRE SPECIALTIES
• SNAP-CLIPS •**

**CUYAHOGA
SPRING CO.**

10280 BEREA ROAD
CLEVELAND, OHIO

INDUSTRY

OPM Purchasing Is Split Into 6 Branches

Washington

• • • Donald M. Nelson, director of purchases, Office of Production Management, has organized his division into six major branches to expedite defense procurement and bring the government's military services into a closer working arrangement with the division.

A contract clearance branch, headed by Col. Hiram S. Brown, retired Army officer, will have responsibility for clearing all major Army and Navy contracts. An industrial and strategic materials branch, of which John Sanger, vice-president, U. S. Gypsum Co. is chief, will help in procuring strategic or essential items. An equipment and supplies branch, assigned the job of smoothing the procurement of building materials, electrical supplies and miscellaneous materials, will be headed by Donald G. Clark, director of purchases, Gulf Oil Corp., Pittsburgh.

A planning and cost estimating branch to study prices and costs of items having defense demand will operate under the direction of Eric Camman, member of a New York firm of accountants. Other branches established by Mr. Nelson include subsistence, and clothing and equipment. Appointed to the subsistence branch as special adviser on inspection problems is J. H. Hamilton, assistant sales manager, American Can Co., Chicago.

Designated as liaison officers between the War and Navy Departments and Mr. Nelson's division are Rear Admiral Charles Conard, former paymaster general and head of the Navy Department's Bureau of Supplies and Accounts, and Brig. General R. H. Jordon, former assistant quartermaster general of the Army. Both retired officers, these men recently were recalled to active duty in the War and Navy Departments at the request of Mr. Nelson.

February Car Sales 345,551

• • • Retail sales of new motor vehicles in the U. S. during February were 345,551 cars and 74,670 trucks. In February, 1940, retail sales totaled 236,857 cars and 47,156 trucks.



The Paper Making Industry

... because of Heppenstall E.I.S. Alloy Steel Chipper Knives, gets from 3 to 5 times more service of knives between grinding. And the knives lose less width in grinding, require less power to operate in the chipper than knives made of plain carbon steel.

Heppenstall



PITTSBURGH · DETROIT · BRIDGEPORT

**Lamson & Sessions Publishes
Symposium on Nuts and Screws**

• • • A collection of practical discussions on engineering, design and production of headed and thread products has been published by the Lamson & Sessions Co., Cleveland, under the title, "Bolts, Nuts & Screws." The collection was compiled by A. E. R. Peterka, technical assistant to the

vice-president of the company, and comprises reprints of 12 articles relating to this subject that have been published in the trade and technical press within the past three years, also one paper presented before the American Institute of Bolt, Nut & Rivet Manufacturers on nut thread tolerances and gaging. Four of the articles have previously been published in **THE IRON AGE**.

DINGS MAGNETIC DRUMS

to remove iron
from foundry sand...
no conveyor belt necessary

DINGS High Intensity Magnetic Drums are designed to remove iron from foundry sand when it is impractical to carry it on a conveyor belt and pass it over a magnetic pulley. These separators, consisting of powerful magnetic coils surrounded by a revolving tubular shell meet all demands for an economical stationary installation with sufficient capacity to handle large quantities of sand per hour, and enough power to extract all the iron.

A large automotive foundry recently installed three Dings Magnetic Drums with outstanding success after finding that pulleys or pulley type separators would be impractical for the following reasons: hot sand would make belting costs excessive; their handling setup includes an apron conveyor which they did not wish to remove as would otherwise have been necessary.

The drums installed in this plant are removing everything from fine shot up to 6" chunks of iron. The drum coils are wound with glass wire to resist heat and for strength and the shells are made of stainless steel to resist abrasive action of the sand.

What conditions must be met by a separator in your plant? Write to Dings today for complete details on the unit that will meet your individual needs.

DINGS MAGNETIC SEPARATOR CO.
Milwaukee, Wis.
535 Smith St.

Complete line of magnetic separators for removing iron from sand, slag, refuse and for separating ferrous and non-ferrous scrap. High Intensity Lifting Magnets for economical metal handling.

Dings
MAGNETIC SEPARATION
HIGH INTENSITY

Illustrating the principle of operation of the Magnetic Drum. Sand passes over drum in normal trajectory while iron is attracted and held to revolving shell until it passes underneath and out of magnetic field where it is discharged.

**Industrial Truck Sales
At An All-Time High**

• • • February bookings of electric industrial trucks and tractors were the largest in the history of the industry, according to figures released by the Industrial Truck Statistical Association, 208 South LaSalle Street, Chicago. During February a total of 478 units was booked, an increase of about 505 per cent over February, 1940.

Total net value of chassis only was \$1,441,521.50, an increase of 399 per cent over the value of bookings in February of last year.

Eighty-one non-elevating platform trucks, with capacities and base chassis prices ranging from 4000 to 6000 lb. and \$1545 to \$3165 respectively, had a total net value of \$146,305. All net values shown are at factories, after additions and deductions for variations from standard specifications, trade in allowances, etc., when applicable. There were 306 cantilever trucks, with capacities and base chassis prices ranging from 1000 to 10,000 lb. and \$1985 to \$9336 respectively, with a total net value of \$954,311.50; 38 light and heavy-duty tractors with base chassis prices ranging from \$1385 to \$3395, had a total net value of \$69,825; 52 crane trucks, capacities and base chassis prices ranging from 3000 to 6000 lb. at 7-ft. radius and \$4780 to \$5840 respectively, had a total net value of \$265,330; one special truck of 4000 lb. capacity had a chassis base price and total net value of \$5750.

The February, 1941, figures shown are after adjustments for cancellations of one 6000 lb. high lift truck with a total net value of \$3550 and one 4000 lb. low lift truck, with a total net value of \$2415, booked in December, 1940, and the first half of February respectively.

Rockford Plants Expand
Rockford, Ill.

• • • Five permits for plant expansions have been issued here. Rockford Machine Tool Co. will add one-story structure, 70 x 100 ft. J. L. Clark Mfg. Co. got three permits for a plant and two garage shed additions. Greenlee Bros. & Co. will add a two-story structure at a reported cost of about \$10,000.

NEWS OF INDUSTRY

Electrochemical Society Holds General Meeting April 16-19

• • • The Electrochemical Society will hold its 79th general meeting at The Cleveland Hotel, Cleveland, April 16-19.

The technical meeting will be divided into three main sessions: (1) Irreversible Electrode Processes—S. Glasstone of Princeton University presiding; (2) High Frequency Electrothermics—P. H. Brace of Westinghouse Electric & Mfg. Co. presiding; (3) Chemical Action in Electric Discharge—M. E. Fogel of Weston Electrical Instrument Co. presiding.

In addition to the three morning technical sessions, the Society has been invited to make afternoon visits to Nela Park and Pitney Glass Works of General Electric Co., the Ferro Enamel Corp., and Easterly Sewage Disposal Plant of Cleveland. Luncheon speakers will include Dr. W. E. Wickenden, president, Case School of Applied Science; Dr. M. Luckiesh, director, Light Laboratory, Nela Park; and Major John Berry of Cleveland Airport.

Toledo Has Only 5 Small Strikes in 1940

Toledo

• • • While many cities are troubled with strikes involving national defense work, Toledo reports only five strikes affecting 473 workers in 1940—just half the number of 1939.

The annual report of Edmund Ruffin, director of the Toledo Industrial Peace Board, shows that 24 disputes, including 16 major groups, which might be classified as potential strikes, were settled amicably without loss of work to the 4191 employees involved. During the year the board handled some phases of 30 industrial disputes involving 5689 workers.

TNEC Issues Steel Monograph

Washington

• • • The TNEC has issued a so-called monograph (No. 42) on the basing point system. The document consists of a summary of testimony presented to the committee by the U. S. Steel Corp. and the Federal Trade Commission.

Pipe Dropped To Conserve Zinc

• • • To conserve zinc for National Defense, the manufacture of Anaconda 67 Brass Pipe is being discontinued, the American Brass Co. has announced to its distributors. No new orders for Anaconda 67 Brass Pipe are being accepted. The company will continue to accept and fill orders for Anaconda 85 Red Brass Pipe, Cop-

per Pipe and Copper Tubes, Types K and L. The 67 Brass Pipe may be obtained from distributors' stocks as long as these supplies last.

American Brass estimates that if all manufacturers of brass pipe adopt this policy, additional zinc at the rate of about 8,000,000 pounds a year will become available for metals vital to the National Defense Program.

GAIRING
Shell Tools

For external grooving of 3" shells.

Cutoff tool for cartridge cases.

For cutting internal Radii in nose of 3.7 shells.

The Gairing Tool Co., Detroit, Michigan
In Canada, Hi-Speed Tools Ltd., Galt, Ont.

SPECIALISTS IN FINE CUTTING
TOOLS FOR 24 YEARS

GOVERNMENT AWARDS

Government Awards

Government awards, during the week ended March 22, 1941, as listed by the Public Contracts Division, Department of Labor, follow:

Iron and Steel Products...\$34,110,995

Aermotor Co., Chicago; triangulation tower \$13,022
Air Associates, Inc., Bendix, N. J.; bolts 15,374
Lester F. Alexander Co., New Orleans; steel barges 90,000

American Bridge Co., Pittsburgh; parts for river locks 10,471
American Forge Division, Chicago; shell, M48, forging 440,000
American Rolling Mill Co., Middletown, Ohio; misc. steel 60,513
American Steel & Wire Co. of N. J., Chicago; helical springs 10,600

cable	15,427
Appleton Elec. Co., Chicago; couplings	47,246
Atwood & Morrill Co., Salem, Mass.; globe stop valves	10,042
Barnes Mfg. Co., Mansfield, Ohio; pipe flanges	82,686
Bethlehem Steel Co., Bethlehem, Pa.; steel wire rope	23,839
Briggs & Stratton, Milwaukee; fuze nose	327,210
fuze	847,000
Carnegie-Illinois Steel Corp., Washington; steel bars, plates, etc.	37,415
steel sheets	45,356
Carson Machine & Supply Co., Oklahoma City; fillers, oil, screw	11,450
Clark Controller Co., Cleveland; junction box straps	228,762
R. D. Cole Mfg. Co., Newman, Ga.; buoy bodies	32,250
Columbia Steel & Shafting Co., Pittsburgh; bar steel	21,647
Commercial Acetylene Supply Co., Inc., New York; empty cylinders	14,500
Crane Co., Washington; steel valves	38,944
bronze valves	49,759
valves	26,691
Cruse-Kemper Co., Ambler, Pa.; anchor and track assy.	22,330
Cuyahoga Steel & Wire Co., Cleveland; steel	12,117
Eagle Mfg. Co., Wellsburg, W. Va.; oil fillers	16,548
Elec. Household Utilities Corp., Hurley Machine Div., Cicero, Ill.; booster	776,141
Economy Fuze & Mfg. Co., Chicago; fuze	605,505
Eureka Vacuum Cleaner Co., Detroit; brass ferrules	19,200
Federal Screw Works, Detroit; fuze parts	232,725
Frost Co., Kenosha, Wis.; cartridge cases	301,696
General Motors Corp., Guide Lamp Div., Anderson, Ind.; ammunition—cartridge cases	4,872,900
Grable Mfg. Co., Cleveland; iron pipe fittings	85,908
Hendrie & Bolthoff Mfg. & Supply Co., Denver; conduit and fittings	16,613
J. B. Hunt & Sons, Raleigh, N. C.; joints; bars; wires	13,630
Ingersoll Steel & Disc Div. of Borg-Warner Corp., Chicago; cartridge case	7,960,500
LaClede Steel Co., St. Louis; steel tubing	110,183
Loman Elec. Supply Co., Boston; conduit and fittings	13,582
Lyon Metal Products, Inc., Aurora, Ill.; steel tool boxes	13,650
work-shop benches	27,708
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; high pressure valves	25,154
Mercer Steel Co., Inc., Portland, Ore.; wire mesh sheets	13,578
Mine & Smelter Supply Co., Denver; thin wall tubing	51,320
Moline Forge, Inc., Chicago; shell, forging	496,000
National Cash Register Co., Dayton, Ohio; fuze	174,000
Norris Stamping & Mfg. Co., Los Angeles; cartridge cases	51,600
North American Iron & Steel Co., Inc., Brooklyn; booms, cargo	15,120
Oklahoma Drainage Products Co., Oklahoma City; coated metal pipe	18,644
Paulson Tools, Inc., Wallingford, Conn.; chisels	10,264
Pressed Steel Car Co., Chicago; shell, forging	2,191,000
Revere Copper & Brass, Inc., Chicago; cartridge case	2,235,200
Rheem Mfg. Co., Philadelphia; fins for bombs	122,612
bodies and fins	3,051,657
John A. Roebling's Sons Co., Trenton, N. J.; wire rope	19,425



Compression • Extension • Torsion Springtime

WHEN the time comes for you to buy springs, give thought to the quality and service you can get from Accurate. Whether the spring you need is the tiniest hair-like coil or a stout steel brute for slam-bang service, you'll find that Accurate controls and checks quality to the "nth" degree. Accurate builds dependability into its products to help you build it into yours. Accurate takes more than ordinary measures to meet delivery dates to help you meet yours. This care is building business for Accurate. It will help do the same for you. Let Accurate meet your next spring requirements — write today.



Accurate
Springs

Write today for the new Accurate Handbook — FREE

ACCURATE SPRING MANUFACTURING CO.
3819 West Lake Street

Chicago, Illinois

GOVERNMENT AWARDS

Russakov Can Co., Chicago; bodies and fins for bombs	129,000	diesel engines	15,704	Clyde Equipment Co., Seattle; air compressors and tanks	11,692
Simplex Wire & Cable Co., Cambridge, Mass.; shore-use cable	16,641	J. I. Case Co., Racine, Wis.; shell, forging and machining	4,696,038	Clyde Iron Works, Inc., Duluth; winches	33,600
A. O. Smith Corporation, Milwaukee; bomb bodies	3,561,500	Caterpillar Tractor Co., Peoria, Ill.; tractors	80,954	Columbian Iron Works, Chattanooga, Tenn.; machining shell	1,035,480
Snap-On Tools Corp., Kenosha, Wis.; wrenches	26,250	Chambersburg Engineering Co., Chambersburg, Pa.; stamping machines	12,905	Condenser Service & Eng. Co., Inc., Hoboken, N. J.; air ejectors	33,000
Stewart-Warner Corp., Chicago; fuses	2,798,983	Clark Tractor, Div. Clark Equipment Co., Battle Creek, Mich.; lift trucks	12,510	drain collecting units	35,207
Superior Sheet Steel Co., Div. of Continental Steel Corp., Canton, Ohio; terne plate	45,816	Climax Engineering Co., Clinton, Iowa; generating plants	21,399	Consolidated Machine Tool Corp., Rochester, N. Y.; planer	167,470
S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings	17,072	F. D. Cline, Raleigh, N. C.; paving equipment, equipment for processing asphalt	26,788	Continental Motors Corp., Muskegon, Mich.; baffle; bars, shafts, etc.	119,596
Thatcher Furnace Co., Newark; coal burning furnaces	172,830			Copeland Refrigeration Corp., Sidney, Ohio; mortuary cabinets	15,562
Titan Metal Mfg. Co., Bellefonte, Pa.; plunger for fuze	37,596				
Truscon Steel Co., Minneapolis; hangar doors	35,616				
Ware Bros. Div. of Chicago Roller Skate Co., Chicago; boosters	995,807				
Washington Corrugated Culvert Co., Seattle; culverts and fittings	39,276				
Weaver Mfg. Co., Springfield, Ill.; towing bars	11,508				
Western Metal Mfg. Co. of Texas, Houston; galvanized corrugated pipe arches	11,206				
J. H. Williams & Co., New York; wrenches and clamps	10,100				
Winner Mfg. Co., Inc., Trenton, N. J.; buoys	20,823				
Wire Rope Mfg. & Equipment Co., Seattle; wire rope	104,243				

Nonferrous Metals and Alloys \$522,907

American Brass Co., American Metal Hose Branch, Waterbury, Conn.; bronze hose	\$143,322
Anaconda Sales Co., New York; slab zinc	12,375
Chase Brass & Copper Co., Inc., Waterbury, Conn.; timing disc	13,875
Elgin National Watch Co., Elgin, Ill.; timers	11,025
General Electric Supply Corp., Dayton, Ohio; lamp assembly	24,479
Graybar Electric Co., Inc., Dayton, Ohio; fluorescent fixtures	10,650
New Jersey Zinc Sales Co., Inc., New York; zinc, plates, rolled	19,415
Niagara Searchlight Co., Inc., Niagara Falls, N. Y.; flashlights	12,067
Reed & Barton Corp., Taunton, Mass.; tableware	51,502
Rembrandt Lamp Corp., Chicago; bridge lamp	11,900
Revere Copper & Brass, Inc., Balt. Div., Baltimore; tubing and pipe, copper	16,425
Revere Copper & Brass, Inc., Baltimore Div., Baltimore; condenser tubes	101,844
Westinghouse Elec. & Mfg. Co., Washington; airport lighting materials	19,640

Other Machinery \$32,835,788

American Car & Foundry Co., New York; flat cars	\$31,500
American Laundry Mach Co., Cincinnati; laundry equipment	81,749
American Machine & Metals, Inc., E. Moline, Ill.; laundry equipment	273,277
Armstrong Cork Co., Pittsburgh; machining shell	24,114
Bates Mfg. Co., New York; paper fastening machs.	414,750
paper perforators	15,240
Bendix Aviation Corp., Bendix Products Div., South Bend, Ind.; air pumps	12,885
Bendix Aviation Corp., Marine Div., Brooklyn; connection boxes	10,750
E. Bostitch, Inc., Greenwich, R. I.; paper-fastening machs.	16,920
Bryant Machinery & Eng. Co., Chicago; drilling machines	23,850
Buda Co., Harvey, Ill.; spare parts, rods	12,902
	12,259



A battery of 4 electro-analyzers determines copper content of the alloy.

Laboratory Control of Alloying Safeguards AMPCO QUALITY

The Ampco laboratories play a vital part in the production of Ampco Metal,—that unusual alloy of the aluminum bronze class; for metallurgists and technicians check every step in the alloying process. From the virgin-pure ingredients to the finished part, every phase of production is carefully controlled.

Since Ampco Metal is made in 6 grades with a range of physical properties, the alloying process must be exact to consistently meet each range. The Ampco laboratories which control this process are complete—with all necessary apparatus to assure quality production. When you place an order for Ampco Metal, you always secure the grade you need with physical properties that conform to published specifications. Today—next month—a year from now—each grade is uniform. The quality of Ampco Metal never varies.

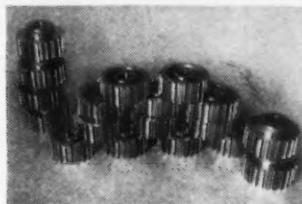
FOR THOSE TOUGH JOBS

Ampco Metal is accepted by American Industry as an alloy that conquers the hard jobs. It has exceptional wear-resistance, durability and strength. It resists shocks, impact, "squashing out," and corrosion. It is truly the "metal without an equal."

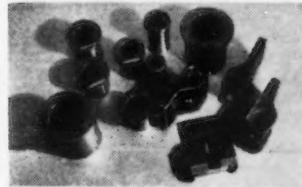
Tell our engineering staff about your metal problems and they will gladly supply you with complete data and recommendations. No obligation on your part.

AMPCO METAL, INC., Dept. IR-43, Milwaukee, Wis.

FORMING DIES...where AMPCO METAL's hardness, its resistance to pinching, wear and impact result in exceptional accuracy and long life.



GEARS...the toughness and wear resistance typical of AMPCO METAL recommends it for all types of gears, ranging from a fraction of a pound to hundreds of pounds each.



BEARINGS...AMPICO METAL is probably more widely used for bearing service than any other bronze. It is noted for its stubborn resistance to wear, "squashing out" and shock loads.



The Metal Without An Equal

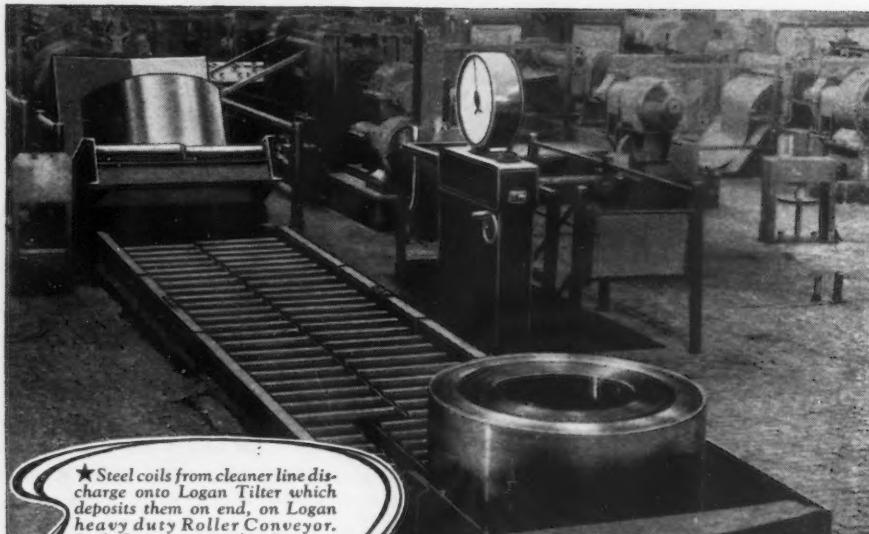
GOVERNMENT AWARDS

Crosley Corp., Cincinnati; gun charging handle	11,991	Eclipse Mach. Div., Bendix Aviation Corp., Elmira Heights, N. Y.; practice shell	112,964
Cummings Machine Works, Boston; testing fixtures	35,700	Electric Wheel Co., Quincy, Ill.; trailers and data	74,500
Curtis Mfg. Co., St. Louis; air compressors	30,951	Ellis Drier Co., Chicago; extractors; ironers	28,816
Dana Tool-D. Nast Machinery Co., Philadelphia; chain hoists	44,850	E. L. Essley Mach. Co., Chicago; milling machines and shapers ..	78,916
Dillon Supply Co., Raleigh, N. C.; drill presses; lathe	12,950	Galion Iron Works & Mfg. Co., Galion, Ohio; road rollers	70,119
Dixie Mill Supply Co., Inc., New Orleans; cast iron pipe	10,537	General Motors Corp., Chevrolet Div., Detroit; tractor-trucks	112,350
Duro Metal Products Co., Chicago; motor maintenance equipment ..	65,270	General Motors Corp., Cleveland Diesel Engine Div., New York; parts for engines and compressors	10,525
Earle Gear & Machine Co., Philadelphia; racks and pinions	53,520		

48 Subcontractors Aid Republic Aviation

• • • Forty eight companies in the U. S. have received subcontracts from Republic Aviation Corp. in the company's efforts to speed production of \$60 million worth of high altitude pursuit planes for the Army. Total of subcontract orders so far is \$2,831,000, a figure which does not include engines or propellers, according to J. L. McClane, vice-president.

The Easy "WEIGH"



★ Steel coils from cleaner line discharge onto Logan Tilter which deposits them on end, on Logan heavy duty Roller Conveyor. Scale Section inserted in line permits weighing en route. Coils picked up for further processing.

Weighing the product en route, without removal from conveyor, is just one of the advantages accruing to this Logan-equipped plant. Efficient ease in all phases of handling regardless of package weight or shape, is the invariable result where Logan Conveyors absorb the burden of intra-plant movement. Logan Conveyor Rolls feature (1) Ruggedness, simplicity. (2) All-steel seals. (3) Outer shield stationary, set back from end of roll. (4) Hexagon shafts. Write for catalog or for nearest engineer to call. LOGAN CO., Incorporated, 545 Cabel St., Louisville, Kentucky.

Logan Conveyors

PUT FLOW INTO PRODUCTION

parts for diesel engines	34,895
diesel engine spares	10,425
Giddings & Lewis, Fond du Lac, Wis.; boring machine	8,012,500
Hanson-Whitney Machine Co., Hartford; gages	10,708
Hardinge Brothers, Inc., Elmira, N. Y.; horizontal milling machines	10,129
Harnischfeger Corp., Milwaukee; Wis.; crane	10,805
Homeelite Corp., Port Chester, N. Y.; portable power plants	30,095
portable elec. generators	11,880
C. Kenneth Hunter, trustee of estate of Johnson Fare Box Co., Chicago; sight assemblies	12,979
Hydraulic Press Mfg. Co., Mount Gilead, Ohio; machine, forging, press	26,499
International Harvester Co., Chicago; shells, forging and machining	1,014,000
practice shell	108,000
limbers and adapters	932,400
Interstate Drake Testing Mach. Co., Los Angeles; brake shoe grinder	16,170
Johnson Motors, Div. Outboard, Marine & Mfg. Co., Waukegan, Ill.; outboard motor	52,656
Kellogg Div., American Brake Shoe & Foundry Co., Rochester, N. Y.; compressors	27,486
Kilby Steel Co., Anniston, Ala.; spike and star cutters	155,415
Leeece-Neville Co., Cleveland; parts for diesel engs.	147,575
LeTourneau Co. of Georgia, Toccoa, Ga.; shell-machining	5,876,250
Lidgerwood Mfg. Co., Elizabeth, N. J.; boat winches	91,876
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages	12,572
Link Belt Co., Chicago; A. A. gun	212,000
Lummus Co., New York; air ejectors	38,597
F. W. McCoy Co., Denver; tractor trucks	45,170
Machinery & Specialties, Inc., Dayton, Ohio; power hack saw	24,140
Mahr Mfg. Co., Div. Diamond Iron Works, Inc., Minneapolis; ear bottom type furnace	10,530
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; signal assemblies	57,500
Marshall & Huschart Mach Co., Chicago; straightening press	14,505
Mathews Conveyor Co., Ellwood City, Pa.; filling machines	14,118
Meili-Blumberg Corp., New Holstein, Wis.; 2-wheel trailers	27,920
Metal Specialty Co., Cincinnati; adapter booster assys.	565,972
Minneapolis-Moline Power Implement Co., Minneapolis; tractors	20,315
Morse Chain Co., Detroit; diesel engine parts	129,970
Northern Pump Co., Minneapolis; pumping units; tools, parts	26,792

GOVERNMENT AWARDS

Norton Co., Worcester, Mass.; grinders	13,990	Boston Woven Hose & Rubber Co., Cambridge, Mass.; bodies, fuzes	30,805	Crucible Steel Co. of America, Harrison, N. J.; steel	2,550
Pacific Marine Supply Co., Seattle; portable pumps	16,316	Brown & Sharpe, Providence; machine, milling	6,625	steel, carbon	2,050
Pacific States Cast Iron Pipe Co., Provo, Utah; pipe and fittings	35,428	Bullard Co., Inc., Bridgeport, Conn.; parts for machine	1,980	steel, bar	2,284
Pa. Pump & Compressor Co., Easton, Pa.; air compressors	11,007	Central Foundry Co., Holt, Ala.; pipe, cast iron	5,752	H. E. Elwell Iron Works, Springfield, Mass.; steel, structural	9,407
Prescott Co., Menominee, Mich.; shell machines	27,000	Cleveland Twist Drill Co., Cleveland; drills, twist	2,004	Equipment Co., Detroit; cutters	4,935
Procter & Schwartz, Inc., Philadelphia; clothing processing	91,652	drills	1,793	Ex-Cell-O Corp., Continental Tool Works Div., Detroit; tools	4,221
Producto Machine Co., Bridgeport, Conn.; fly cutters	11,332	Concrete Steel Co., New York; small arms materiel	6,759	Peter A. Frasse & Co., Philadelphia; drill rods	1,821
Prosperity Co., Inc., Syracuse, N. Y.; laundry presses	30,240	County Supply Co., Plainfield, N. J.; hardware	3,534	Gardner Denver Co., Quincy, Ill.; air compressors	16,440
Pullman-Standard Car Mfg. Co., Chicago; shell	1,575,280			Kent Machine Co., Grand Rapids, Mich.; extracting machines	68,614
Remington Rand, Inc., Washington; key punches, sorters, etc.	37,121			Alfred S. Knesby, Agent, Upper Darby, Pa.; machines	4,000
E. J. Rooksby & Co., Philadelphia; portable boring bars	28,865				
Wm. Sellers & Co., Inc., Philadelphia; plate planer	79,400				
W. E. Shipley Machinery Co., Philadelphia; case turning machine	10,555				
Singer Sewing Machine Co., New York; sewing machines	10,010				
Smith Drum & Co., Philadelphia; laundry ironers	25,824				
Smith Welding Equip. Eastern Corp., Willow Grove, Pa.; oxy-acetylene torches	33,565				
Speed Dump, Inc., New York; hoists and buckets	27,200				
Tuthill Pump Co., Chicago; shell	196,140				
Tyson Roller Bearing Corp., Massillon, Ohio; bearings	17,640				
Union Twist Drill Co., Athol, Mass.; drills	17,370				
United States Motors Corp., Oshkosh, Wis.; generator sets	10,165				
U. S. Pipe & Foundry Co., Philadelphia; cast-iron pipe	10,500				
Vickers, Inc., Waterbury Tool Div., Waterbury, Conn.; hydraulic pumps, motors	40,361				
Vinco Corp., Detroit; gages	20,235				
Walworth Co., Inc., Chicago; shell, machining	2,088,360				
Westinghouse Elec. & Mfg. Co., Washington; forced draft blowers	2,079,570				
reduction gear parts	11,523				
I. J. White Co., New York; dough mixing machines	20,476				
Williams, White & Co., Moline, Ill.; rotary shear	13,450				
Worthington Pump & Mach. Corp., Washington; air compressors	406,768				
War Dept., Ordnance:					
Ace Drill Co., Detroit; drills	\$1,926				
Aluminum Co. of America, Edgewater, N. J.; aluminum	3,375				
American Gas Machine Co., Albert Lea, Minn.; bodies, primer	154,000				
American Rolling Mill Co., Ashland, Ky.; steel	60,513				
American Shim Steel Co., New Kensington, Pa.; steel, strip	22,286				
Ampco Metals, Inc., Milwaukee; rods, welding	2,498				
Apex Tool & Cutter Co., Inc., Shelton, Conn.; arbors, face milling cutter	2,190				
Barker Tool Die & Gauge Co., Detroit; gages	4,466				
Belmet Products, Inc., Brooklyn; tubes for fuse	10,698				
Bennell Machine Co., Inc., Brooklyn; machines, pneumatic	2,027				
Bethlehem Steel Co., Bethlehem, Pa.; steel	15,771				
Brown & Sharpe Mfg. Co., Philadelphia; equipment, tooling	2,440				
hobs	1,882				
Charles H. Besly & Co., Chicago; taps	1,583				
S. S. Blakeslee & Co., Cicero, Ill.; machine, washing	3,513				
Bliss & Laughlin, Inc., Harvey, Ill.; steel, manganese	6,522				

YOUR PROBLEM

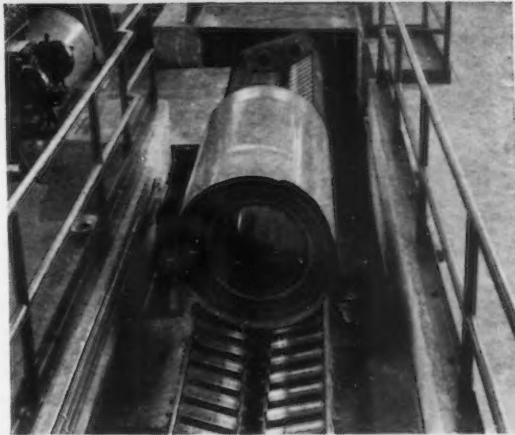
IS

Special

TO A

MATHEWS ENGINEER

● 30 Mathews Field Engineers, all experienced in material and products handling methods, stand ready to work with you on the conveyer problem in your plant. Write today.



INCREASED CAPACITY FOR NATIONAL DEFENSE

Our plant capacity has been increased over 65% to care for the rising demands of the National Defense Program — plus the normal demands of peacetime production. All orders, whether subject to Defense priorities or not, are given the same helpful care and attention that have always marked our dealings with prospects and customers in the past.

MATHEWS CONVEYER COMPANY
142 TENTH ST. - - - - - ELLWOOD CITY, PA.

Field Engineers and Sales Offices
located in 30 Industrial Centers.

LEE

Quality Springs

ALL SHAPES • ALL SIZES • ALL MATERIALS



LEE SPRING COMPANY, Inc.

30 MAIN STREET BROOKLYN, N.Y.



The Harrington & King Co.

PERFORATED METAL

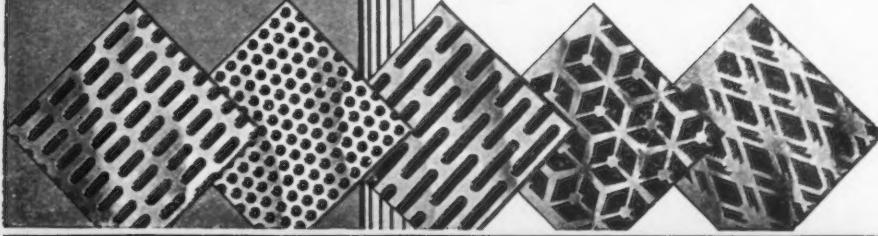
INDUSTRIAL and ORNAMENTAL

H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

Send us your specifications.

ANY METAL-ANY PERFORATION



The Harrington & King Co.

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK

GOVERNMENT

H. R. Krueger & Co., Detroit; machine	4,630
Lewis-Shepard Sales Corp., Water- town, Mass.; trucks, lift	1,612
Lindberg Engineering Co., Chicago; furnaces, annealing	3,561
Lombard & Co., Inc., Somerville, Mass.; grinding wheels	2,520
Magnaflux Corp., Chicago; machines, inspection	2,507
Marshall & Huschart Machinery Co., Chicago; presses	14,505
Micromatic Hone Corp., Detroit; honing heads	2,403
Miller Engineering Machine Co., Newark; assembling machines	1,960
National Forge & Ordnance Co., Irvine, Pa.; steel	2,400
Morton Mfg. Co., Chicago; chests, ammunition	260,025
Niles-Bement-Pond Co., Pratt & Whitney Div., West Hartford; tools, grooving	7,700
Norton Co., Philadelphia; wheels	2,577
Nutley Engineering Works, Nutley, N. J.; machines, painting	2,591
Putnam Tool Co., Detroit; tools	10,353
Reliable Tool Co., Irvington, N. J.; tools	5,124
Republic Steel Corp., Alloy Steel Div., Massillon, Ohio; steel, corrosion resisting	27,206
Revere Copper & Brass, Inc., Baltimore; brass	21,692
F. H. Robertson Co., Malden, Mass.; tools	1,500
Scovill Manufacturing Co., Water- bury, Conn.; heads, plunger	52,980
Sheffield Gage Corp., Dayton, Ohio; gages	3,315
W. E. Shipley Machinery Co., Philadelphia; turning machines	10,555
W. E. Shipley Machinery Co., Philadelphia; oil extractors	2,799
Singer Sewing Machine Co., Bridge- port, Conn.; machine, sewing	2,350
Snap-On Tools Corp., Kenosha, Wis.; wrenches and handles	2,217
Star Engineering Co., Newark; drills	1,720
Swind Machinery Co., Philadelphia; shapers	3,065
Taft Peirce Mfg. Co., Woonsocket, R. I.; gages	3,240
Talon, Inc., Meadville, Crawford Co., Pa.; gages	5,802
The Shovel Co., Philadelphia; cranes, revolving	9,425
Toledo Scale Co., Philadelphia; gages	1,595
Transue & Williams Steel Forging Corp., Alliance, Ohio; connections, end	6,480
Union Twist Drill Co., Athol, Mass.; reamers	2,157
Union Twist Drill Co., Athol, Mass.; cutters, high speed steel	5,502
Veit & Young, Philadelphia; tools	45,988
Waterbury Farrel Foundry & Ma- chine Co., Waterbury, Conn.; presses	6,950
Weldon Tool Co., Cleveland; tools	7,840
Western Cartridge Co., Winchester Repeating Arms Co. Div., New Haven, Conn.; small arms materiel	1,998
Howard L. White, Brooklyn; tools	3,200
Whitehead & Kales Co., River Rouge, Mich.; trailers	2,220
Navy Dept., Bureau of Supplies and Accounts:	
Aldrich Pump Co., Allentown, Pa.; pumps, sea water, etc.	\$8,892
American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy	162,590
American Chain & Cable Co., Inc., Reading-Pratt & Cady Div., Reading, Pa.; valves, lift check, steel	18,450

AWARDS

**U. S. Will Complete
Allis Condensers**

Charlestown, Ind.

• • • Two unfinished Allis-Chalmers condensers were shipped to the \$84,000,000 government ordnance plant here to be completed and installed on the grounds so that production of smokeless powder may begin May 17. Condensers were about 75 per cent completed when shipped here. The Allis-Chalmers plant has been on strike since Jan. 22.

American Rolling Mill Co., Pipe & Formed Products Sales Div., Middletown, Ohio; pipe, steel, including special couplings	315,786
American Steel & Wire Co. of N. J., Washington; nails, wire, steel cable, electric	9,996
steel, corrosion-resisting bar	40,320
Ames Iron Works Div., Pierce, Butler Radiator Corp., Oswego, N. Y.; units, hot water heating	88,591
Anaconda Wire & Cable Co., New York; cable, electric; double, triple, four and multi-conductor, cable, electric	47,826
Baker - Raulang Co., Cleveland; truck, crane, electric	22,943
Baldt Anchor, Chain & Forge Co., Chester, Pa.; chains, anchor; links, detachable; shots, etc.	569,705
Bendix Aviation Corp. (Weiss Joint Div.), South Bend, Ind.; aircraft engine parts	8,545
Bendix Aviation Corp., Pioneer Instrument Div., Bendix, N. J.; gage assys.	316,760
Bertsch & Co., Inc., Cambridge City, Ind.; roll, plate bending	300,000
Boston Insulated Wire & Cable Co., Boston; cable, electric	27,480
Buffalo Forge Co., Buffalo; centrifugal fan cooling system at Wright Field, Dayton, Ohio; fans, ventilating	9,325
Cincinnati Shaper Co., Cincinnati; shears, power, squaring	61,823
Collyer Insulated Wire Co., Pawtucket, R. I.; cable, electric	88,043
Columbia Steel Co., Washington; nails, wire, steel	105,015
Crane Co., Washington; fittings, pipe, and unions; composition	18,980
Crucible Steel Co. of America, New York; steel, bar, alloy	129,593
Diamond Power Specialty Corp., Detroit; gages	8,718
Elwell-Parker Electric Co., Cleveland; trucks, tilting, tiering, telescopic fork type, elec. dr., etc.	249,972
Engineering & Research Corp., Riverdale, Md.; blades, for test clubs, hubs, propeller and propellers, test club	11,442
Fairbanks, Morse & Co., Beloit, Wis.; propelling machinery for submarine chasers	38,160
Fleetwings, Inc., Bristol, Pa.; aircraft parts	12,677
Gardner-Denver Co., Washington; compressors, air, low pressure	76,000
General Electric Co., Schenectady; locomotive, 50-ton, diesel, electric	4,565,000
Gisholt Machine Co., Madison, Wis.; machine, balancing, dynamic	2,483,919
C. H. Gosiger Machinery Co., Dayton, Ohio; drill presses	16,341
G. A. Gray Co., Cincinnati; planer, open-side	24,414
	304,661
	11,350
	23,800
	32,510

FLUOR SPAR

Guaranteed
85% plus in
Calcium
Fluoride
Not to exceed
5% silica
In bulk



Barges
500 tons
Ohio River
from our
river loading
station at
Roscilare

Rail shipments from Rosiclare, Ill., on Ill. Cent. RR

WASHED GRAVEL

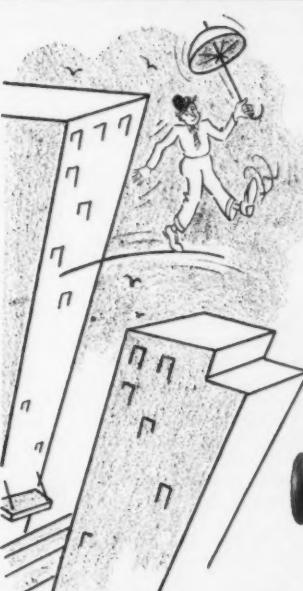
HILLSIDE FLUOR SPAR MINES

38 So. Dearborn St.

Phone: Ran. 1151

CHICAGO, ILL.

THERE'S NEVER A DULL MOMENT FOR A WELLS SAW!



A Wells Saw in your plant will never get a rest!

It's such a speedy, accurate, time and labor saver, you'll wonder how you got along without it. It's dependable, it's portable—it's a real all-around tool of 1000 uses in any spot in the plant:

1. **MAINTENANCE WORK**—There's plenty of that when plants are going full tilt. A Wells Saw will work wonders in emergencies when speedy work is essential. On routine work a Wells will save time, labor, reduce maintenance costs.

2. **GENERAL WORK**—For any metal cutting job in stock rooms, tool rooms or elsewhere the



Now Built in 3 Sizes
No. 5-5" dia. round or
5" x 10" flat.
No. 8-8" dia. round or
8" x 16" flat.
No. 12-12" dia. round or
12" x 16" flat.
Also the No. 9 Upright Saws.

simplicity, speed and accuracy of Wells Saws will save time and money every day.

3. **PRODUCTION WORK**—For continuous all-day output, Wells speed, accuracy and rugged construction make it first choice for big output at low cost.

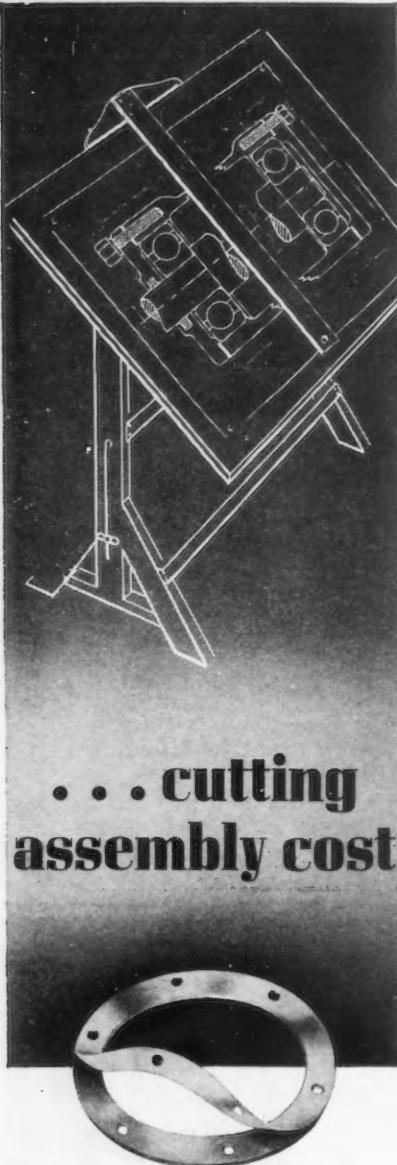
Put a Wells—the saw that saves—to work in your plant now. Write for complete details and literature.

WELLS MFG. CORP.

Three Rivers, Michigan

WELLS METAL CUTTING BAND **SAWS**

GOVERNMENT AWARDS



... cutting
assembly cost

to help sell it

For quick precision assembly, simply *peel* .002 or .003 inch precision gage laminations from the solid Laminum shim. Provide easy, accurate adjustment . . . to fitted mechanical parts such as bearing assemblies, sliding fits, gear clusters and the like. Help meet your competition through lower assembly costs. • *Shims cut to your order. Stock shim materials obtainable from mill supply distributors.*

Laminated Shim Co., Inc.
76 Union St., Glenbrook, Conn.

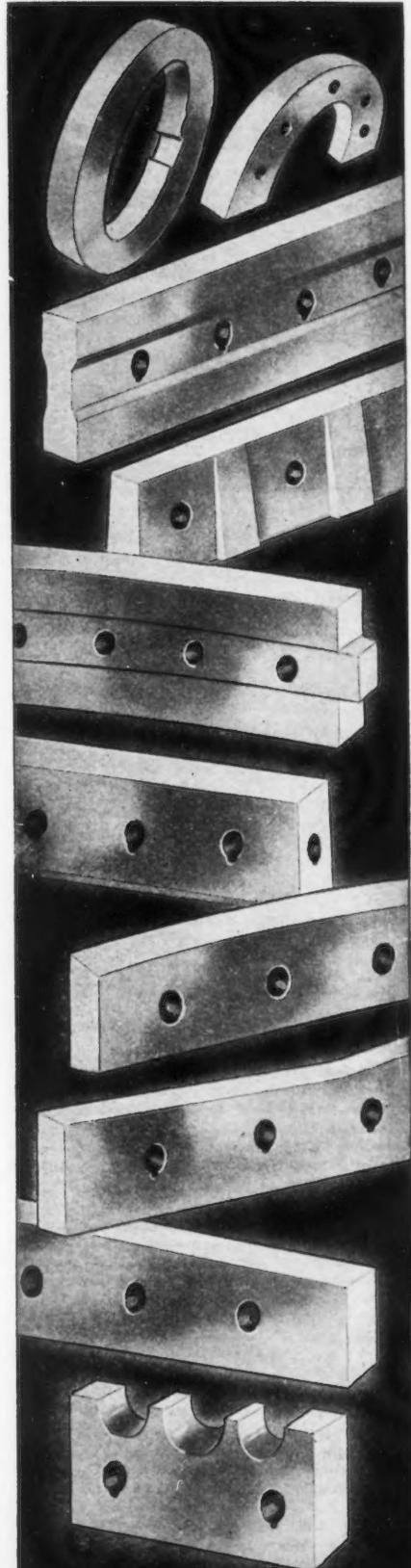
Write for file-folder of shim application photos—with Laminum sample.

LAMINUM
THE SOLID SHIM THAT *peels* FOR
ADJUSTMENT
A-1169

Graybar Electric Co., Inc., Washington; shackles, pin	83,413
Hardie Tynes Mfg. Co., Birmingham; compressors, air, high pressure motor driven, etc.	43,838
Hevi Duty Electric Co., Milwaukee; furnaces, electric	68,245
Howard Foundry Co., Chicago; assemblies, protecting cap, waterproof	450,800
Jones & Laughlin Steel Corp., Pittsburgh; nails, wire, steel	18,020
Lindberg Engrg. Co., Chicago; furnaces, gas and electric	94,106
Magna Mfg. Co., Inc., New York; magnesium, flat shavings	24,890
Mahr Mfg. Co., Minneapolis; torches, oil, portable	7,972
Maine Steel, Inc., S. Portland, Me.; shackles, pin	22,921
McKissick Products Corp., Tulsa, Okla.; blocks, wire rope	19,338
Metal Reduction Corp. of N. J., North Bergen, N. J.; bronze, ingots	60,700
Monarch Machine Tool Co., Sidney, Ohio; lathes, precision	14,965
Moore Eastwood & Co., Dayton, Ohio; generators	42,684
Morse Diving Equipment Co., Inc., Boston; lamps, electric, diving, with reflector	5,820
Mound Tool Co., St. Louis; tools, packing, extracting	15,191
National Electric Products Corp., Pittsburgh; cable, electric	52,810
Ohio Pattern Works & Foundry Co., Cincinnati; pumps	10,464
Okonite Co., Passaic, N. J.; cable, electric	73,850
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Div., New York; cable, electric	40,546
Pittsburgh Steel Co., Pittsburgh; tubes, boiler, steel	56,359
Plumb Tool Co., Los Angeles; tools	40,661
Henry Prentiss & Co., Inc., New York; lathe, turret, universal, etc.	8,793
Reynolds Metal Co., Louisville, Ky.; aluminum, ribbon, soft	7,640
Rockbestos Products Corp., New Haven, Conn.; cable, electric	36,149
Rockford Machine Tool Co., Rockford, Ill.; planers	38,624
John A. Roebling's Sons Co., Trenton, N. J.; jackstays, pendants, rope and beackets	85,074
Schutte & Koerting Co., Philadelphia; pumps	11,617
W. E. Shipley Machinery Corp., Philadelphia; grinder, surface, rotary, vertical	8,740
Singer Mfg. Co., Elizabeth, N. J.; artillery parts	860,000
Sperry Gyroscope Co., Inc., Brooklyn; equipments, gyro compass	877,298
Harold E. Trent Co., Philadelphia; furnaces, electric	9,006
Trenton Pipe Nipple Corp., Trenton, N. J.; nipples, brass	20,036
Warner & Swasey Co., Cleveland; lathes, turret, horizontal, etc.	54,912
Williams, White & Co., Moline, Ill.; shear, rotary, self-contained, etc.	9,200
Worthington Pump & Machinery Corp., Washington; compressors, air	48,437
Youngstown Sheet & Tube Co., Youngstown, Ohio; pipe, steel, including special couplings	1,093,030

War Dept., Other Agencies:

Allmetals Welding & Mfg. Co., Baltimore; metal stools	\$1,213
G. S. Blakeslee & Co., Chicago; dishwashing machines	2,640
Chase Brass & Copper Co., Inc., Cleveland; expansion of ammunition brass and cartridge case mfg. facilities	16,000,000
Chris-Craft Corp., Algonac, Mich.; cruisers	7,788
Continental Can Co., New York; canisters	47,260
Eaton Mfg. Co. (Axe Div.), Cleveland; aircraft engine parts	388,966



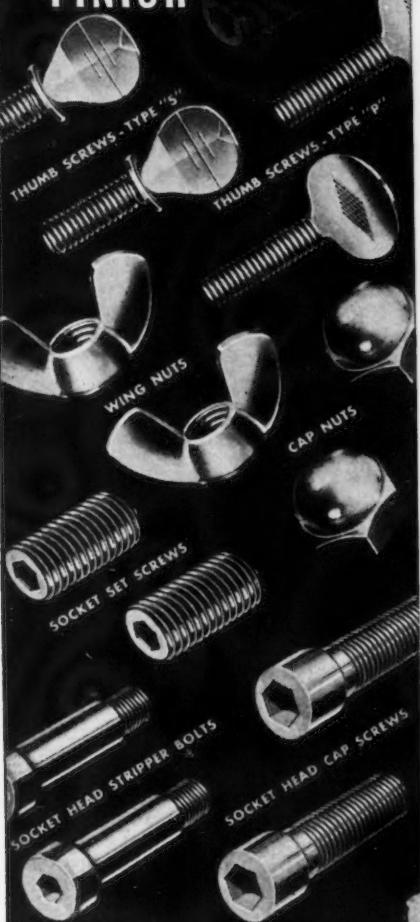
Greater Tonnage
Per Edge of Blade



AMERICAN
SHEAR KNIFE CO.
HOMESTEAD · PENNSYLVANIA

GOVERNMENT AWARDS

Cold-forged FOR STRENGTH... UNIFORMITY... FINISH



Produced by an improved process, developed through years of experience in the manufacture of precision screw products, Parker-Kalon Wing Nuts, Cap Nuts, Thumb Screws and Socket Screws have the quality that wins unqualified approval of engineers and production men. Write for free samples . . . compare . . . see for yourself. Stocked by reliable industrial distributors near you.

PARKER-KALON CORP.
200-202 Varick St., New York, N.Y.

PARKER-KALON
Cold-forged
SOCKET SCREWS
WING NUTS • CAP NUTS
THUMB SCREWS
SOLD THROUGH REPUTABLE DISTRIBUTORS

Fargo Motor, Detroit; trucks, $\frac{1}{2}$ ton	92,165
Federal Motor, Detroit; trucks, 5-ton	38,760
Galion Iron Works & Mfg. Co., Galion, Ohio; road rollers	70,119
General Electric Co., Schenectady; set power plant equipment	11,916
General Motors Corp., Chevrolet Div., Detroit; trucks, $\frac{1}{2}$ ton	244,613
General Motors Corp., Chevrolet Div., Detroit; tractor-trucks	47,490
Gramm Motors, Delphos, Ohio; semi-trailers	17,923
Graybar Electric Co., Portland, Ore.; parkway cable	4,652
Hudson Canvas Products, Inc., New York; tool rolls	515
Indian Motorcycle Co., Springfield, Mass.; motorcycles with sidecars	2,251
Inter-Harvester, Chicago; trucks, Lavine Gear, Milwaukee; trailers, 1-ton	149,184
Lundquist Tool & Mfg. Co., Worcester, Mass.; parts for reels	481,244
Milwaukee Stamping Co., Milwaukee, Wis.; canisters	59,481
National Cast Iron Pipe, Birmingham; water pipe, cast iron	43,475
Pittsburgh Water Heater Co., San Francisco; gas water heaters	2,730
Republic Aviation Corp., Farmingdale, L. I., N. Y.; maintenance parts for airplanes	2,167
Sawtooth Co., Boise, Idaho; diesel oil storage tanks	625,288
Smith-Courtney Co., Richmond; 16-in. metal shaping machine	6,141
Universal Building Products Corp., Dallas; shelters, field maintenance	3,000
Wilcox-Rich Div., Eaton Mfg. Co., Marshall, Mich.; aircraft engine parts	727,650
Wilcox-Rich Div., Eaton Mfg. Co., Saginaw, Mich.; airplane engine parts	309,828
Winter-Weiss, Denver; semi-trailers	278,043
Worthington Pump & Mch. Corp., Holyoke, Mass.; air compressor	35,730
	2,029

Trade Notes

Silver & Co., scrap dealer handling all types of material from automobile bodies and fenders to top grades, has moved its headquarters to the Board of Trade Building, Chicago. Morris J. Silver, president, announces.

Anglo-American Metal & Ferro Alloy Corp. announces it will engage in manufacture of nickel steels and allied products through a subsidiary, American Nickel Alloy Mfg. Co. Both companies have moved their offices to the Hudson Terminal Building, 50 Church Street, New York.

Newtown Iron & Steel Corp. has moved its office and plant to 230 Morgan Avenue, Brooklyn, N. Y.

Milwaukee Mfg. Corp., 161 W. Wisconsin Avenue, Milwaukee, has been organized by A. J. Herzberg, Stephen Pohlhammer and Henry Holthusen to handle welding and general machinery.

Modern Grinder Mfg. Co., Fond du Lac, Wis., has changed its name to American Hydraulics, Inc., and increased its stock from \$200,000 to \$300,000.

Hanson-Van Winkle-Munning Co. of Matawan, N. J., manufacturer of electroplating equipment and supplies, has finished a complete renovation of their Bridgeport, Conn., factory.

A. Leschen & Sons Rope Co., St. Louis, Mo., has announced installation of a large new wire rope making machine.

THERE'S A DIFFERENCE UNDER THE PAINT!

IT'S what is under the paint that makes the difference in lockers. One locker stands up—another locker can't "take it." Maintenance costs of one locker are next to nothing—for another they are unnecessarily high.

A-S-E Lockers have proved their *extra strength*. A-S-E experience in design and construction assures extra strength at the points where damage or excessive wear is likely to occur.

For instance, note in the illustration at the left how the steel of the cross channel is depressed to fit flush with the angle upright, riveted with two flush rivets. This guarantees rigidity and permanent alignment in locker frames.

In the illustration at right is shown a cutaway view through the bottom and lower frame channel of the A-S-E Locker. The bottom is flush with the frame for ease in cleaning, and its lower edge rests on the under flange of the channel.

Strength and smoothness are assured.

There is an A-S-E Modern Locker for every need—box lockers, single- and double-tier lockers. Mail coupon for the complete facts . . . and the many other points of A-S-E Locker superiority. There is no obligation.

ALL-STEEL-EQUIP COMPANY, Inc.
702 JOHN STREET
AURORA • ILLINOIS

ALL-STEEL-EQUIP COMPANY
Incorporated

704 John Street, Aurora, Ill.

Please send me illustrated folder, containing the complete facts on A-S-E Modern Lockers.

Name

Address

City State

Cleveland Suburb Is Industrial Boom Town

Cleveland

• • • Suburban Euclid, a mere village on the eastern fringe of Cleveland up to a few years ago, is the war-time boom town of this area. Its fields and farms are disappearing under the heaviest simultaneous concentration of new plants ever experienced here.

In the last three months Euclid has lined up as much industrial expansion as took place in all greater Cleveland during 1940. Addressograph-Multigraph Corp., manufacturers of business machines, is the latest firm to expand in Euclid. It will build a \$750,000 addition to its plant, necessitated by a variety of defense orders, including millions of army identification tags.

Chase Brass & Copper Co. plans a new \$16,000,000 plant in Euclid for production of brass artillery shell cases. Thomson Air Products Co. will spend \$15,000,000 in Euclid for a large new plant.



BUILDING A PIPE LINE during a flood. This photo shows a section of the new 220-mile pipe line recently completed for Pan American Oil Co. from East Texas to the Gulf of Mexico. The line was "stove piped," with the crew concentrated at each joint, lining up the pipe, tacking the joint and doing the finish welding. Lincoln "Fleetwood" shielded arc type electrodes and 200 amp Lincoln engine-driven welders were used.

Mitchell Metal Products Co. plans to move from Cleveland to Euclid. It is reported that Cleveland Hobbing Machine Co., which is building a vertical lathe for shell turning and has furnished some of these machines to automotive defense plants, will build a new plant at Euclid.

A new high speed tractor designed to haul big guns faster than ever before is being devel-

oped by Cleveland Tractor Co. and may mean another factory expansion for Euclid.

Forty-nine acres in the fast-growing suburb have been set aside for 214 dwelling units but many hundred additional homes will be needed.

A vocational guidance committee has been set up by Euclid to attempt to assist job seekers and the new manufacturing plants which will be looking for many thousands of employees.

RODINE

Makes Pickling Efficient

- Stops Waste of Acid and Metal.
- Prevents Over-Pickling.
- Eliminates Acid Fumes.
- Reduces Acid Brittleness.
- Cuts Costs.
- Increases Tonnage.

Bulletin on request



AMERICAN CHEMICAL PAINT CO.
Main Office & Works AMBLER, PENNA.

3840 Complete Training In Indianapolis Courses

Indianapolis, Ind.

• • • Opening of the seventh emergency industrial training program for defense on Mar. 31 marked completion of the training of 3840 men in the six courses conducted here so far. Courses are conducted by Indianapolis public schools, classes being open from 4.30 p.m. until 7.00 a.m. Men on regular day shifts attend in the afternoon and early evening, while others go to school between midnight and seven.

Stearman Completes 1000th Trainer

• • • The Stearman Division of Boeing Airplane Co., Wichita, Kan., this month delivered its 1000th primary trainer under Army and Navy defense contracts. It is believed to be the first manufacturer to deliver this number of planes under the national defense program.

**Copperweld Co.'s Electric
Steel Capacity 240,000 Tons**
Warren, Ohio

• • • Copperweld Steel Co. announces that upon completion about May 1 of four additional electric melting furnaces now building, the company's Warren plant will, with a monthly ingot capacity of approximately 20,000 tons, move up to a position as one of the country's largest producers of electric furnace steels. Upon completion of Copperweld's current construction program the company will be operating two electric furnaces producing 40-ton heats (now in operation); one electric furnace producing 50-ton heats, which will begin operation about April 10; one electric furnace producing 14-ton heats, beginning operation about April 25; and two electric furnaces each of which will produce 10-ton heats, one to be in operation about April 5, the second to be ready about May 1.

Copperweld also announces that work is progressing rapidly on the new 12-in. mill at Warren which is scheduled for completion about May 1. Additional heat-treating furnaces now building and scheduled for completion about May 1 will increase the plant's heat-treating capacity to approximately 3000 tons per month.

**Indiana Steel Products
Strike of 200 Is Settled**
Valparaiso, Ind.

• • • Strike at Indiana Steel Products Co., involving 200 men, was settled by agreement between two unions. An AFL metal trades union held a valid contract good until Nov. 15, 1941. The CIO waived temporarily claim for bargaining agent rights, and agreed that its demands should be negotiated by an AFL committee.

Indiana Payrolls at New Peak
Indianapolis, Ind.

• • • February set a state record for factory payrolls, with 325,962 earning a average of \$9,505,657 weekly. Previous high was set in February 1927 with 305,550 on factory payrolls.

the practical side of Springmaking — BY DUNBAR

"We don't know
all about
Springs
... but all we DO
know is Springs"



We recommend a weight test in the specifications of extension springs. The tolerance desired on that specification will tell whether no test, a spot test or 100% test is necessary. As this factor can vary the cost of a spring, it is plain that easy tolerances can save you money.

There are other savings in style of end, correct material, finish, method of assembly, proper initial tension.

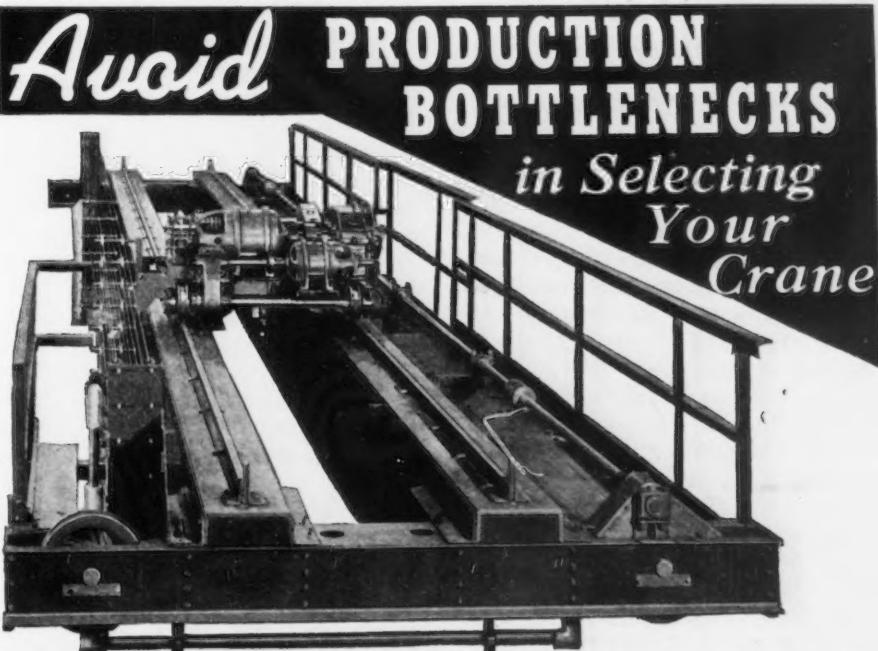
You may be paying for spring quality you don't need—or you may find that a better spring can bring you savings. It's up to a good springmaker to help you find out.

FOR PRACTICAL SPRING ADVICE, CALL ON

Dunbar Bros. Co., Bristol, Conn.

DIVISION OF ASSOCIATED SPRING CORPORATION

"Quality Springs Since 1845"



**EUCLID
CRANES
&
HOISTS**

Consistently fast movement of material and uncommonly dependable service have always been features of Euclid Cranes. They won't "bottleneck" your production through sluggish operation or in time-consuming adjustments or repairs.

Write for the New Catalog, just off the press.

THE EUCLID CRANE & HOIST CO.
1361 Chardon Rd. Euclid, Ohio



Photo by Wide World

ONE OF BRITAIN'S 12-in. howitzers on railway mounting with camouflage covering, manned and ready for use against invaders. It fires shells weighing a third of a ton. (Photo passed by British censor).

Canada's Steel Output Tapers In February

Toronto

• • • Production of iron and steel in Canada for February fell below the high record of January, largely the result of the shorter month. For February, pig iron output totaled 91,165 gross tons compared with 103,085 tons in January and 87,032 tons in February, 1940. Production averaged 3256 tons a day in February, against average of 3327 tons in January and 3108 tons in February a year ago. Of the month's total, output included 78,164 tons of basic iron, all of which was for further use of producing firms; 5014 tons of foundry iron and 7987 tons of malleable, all of the latter two grades being for sale. For the first two months of this year pig iron production totaled 194,250 gross tons compared with 191,735 gross tons in the corresponding period of 1940. At the end of February eight blast furnaces were blowing out of 10 in Canada.

Output of ferroalloys during February amounted to 11,471 gross tons, down from 15,231 tons in January and comparing with 7711 tons

in February, 1940. For the first two months of the year output totaled 26,702 gross tons against 15,557 tons in the same period of 1940.

February's production of steel ingots and direct steel castings was 172,698 gross tons as compared with 186,303 tons made in January and 140,343 tons in February, 1940. The month's output included 166,847 tons of steel ingots and 5851 tons of steel castings. In the first two months of this year cumulative production totaled 358,975 gross tons up from 306,839 tons in the same period of 1940.

Canada Completes 808 Trainers

Ottawa

• • • Construction of the 808 elementary flying training planes required under the air training plan was completed last week many months ahead of the original schedule, C. D. Howe, Minister of Munitions and Supply announced. The orders for these planes in which pilots receive their initial flying experience were placed with Fleet Aircraft and DeHavilland Aircraft.

Canada Cuts Non-War Building To Save Steel

Toronto

• • • Following the earlier announcement by H. D. Scully, Canadian Steel Controller, regarding curtailment in the number of shape sizes that may be produced in Canadian mills, the steel controller has announced a new regulation which deals with deliveries of structural steel. Under the new regulation it is proposed to curtail use of steel in construction projects, other than those directly associated with Canada's war effort, which will affect many of the larger buildings under way or contemplated. Under the new ruling a special permit will be required for all non-war construction.

The use of steel in industrial, commercial and public structures, including bridges, schools and churches, will be allowed only for war purposes or if an emergency is proved to exist. The new restriction applies both to structural steel and reinforcing steel or concrete construction. Only a grave emergency requirement in non-war construction will be recognized. The regulation has been introduced to curtail use of steel in building activities, thus throwing larger tonnages of steel into war industry. Due to shortage of steel larger quantities of wood have been used in recent months and it is proposed to replace steel with wood on a much greater scale in the future. Under the new ruling large buildings, such as apartments, and similar projects, requiring steel, will either be abandoned temporarily or reduced in size to permit use of wood for structural work.

Directors of Canadian Pacific Railway Co., Montreal, are asking approval of capital appropriations totaling \$15,146,313, of which \$9,730,950 will be required for purchase of new rolling stock. Rolling stock purchases will include 35 Pacific-type locomotives; 250 twin hopper coal cars; 250 three-hopper coal cars; 500 box cars; 150 automobile cars; 25 conductors' vans, and 25 first class coaches.

Fleet Aircraft, Ltd., Fort Erie, Ont., plans to start work at an early date on an overhaul depot

NEWS OF INDUSTRY

and repair plant adjacent to Crimlin Airport at London, Ont., at a cost of approximately \$1,000,000.

Preliminary negotiations are under way directed towards construction in Canadian shipyards of 4700-ton cargo ships. The new type of cargo ship will be for Canadian account. Previously contracts were let for building 20 freighters, 9500 tons, for the British Government. The proposed new orders will be placed through the Department of Munitions and Supply, Ottawa.

For the week ending March 21, the Department of Munitions and Supply awarded 1860 contracts having total value of \$25,373,683, including orders to United States companies valued at \$136,214. Contracts placed include:

Capital expenditure—John Hay & Co., Ltd., Eastview, Ont., \$33,770; Canadian General Electric Co., Ltd., Peterborough, Ont., \$270,000; Firestone Tire & Rubber Co., Ltd., Hamilton, \$128,351.

Munitions—Western Steel Products Corp., Ltd., Ottawa, \$53,741; Art Metal Co., Ltd., Galt, Ont., \$58,206.

Ordnance—Canadian General Electric Co., Ltd., Peterborough, \$686,500; John Inglis Co., Ltd., Toronto, \$138,441.

Electrical equipment—Small Electric Motors of Canada, Ltd., Toronto, \$432,000.

Aircraft—National Steel Car Corp., Ltd., Malton, \$174,990; Fleet Aircraft, Ltd., Fort Erie, Ont., \$435,753.

Mechanical transport—General Motors Products of Canada, Ltd., Oshawa, \$48,002.

Dockyard supplies—Instruments Limited, Ottawa, \$32,702.

Shipbuilding—J. J. Taylor & Sons, Ltd., Toronto, \$170,000; Greavette Boats, Ltd., Gravenhurst, Ont., \$170,000.

92 Steel Items Exempt From Export Licensing

Washington

• • • In an interpretation of the regulations governing the exportation of iron and steel products under the export licensing control system, the State Department last week announced that 92 items would be specifically exempted from the licensing requirement. These products include anchors, anvils, aprons, automotive wheels and discs, locomotive axles, and the following additional items:

Barrel hoop steel or iron, cut to length with rounded ends, but not punched or otherwise fabricated, if shipped with requisite number of shooks for assembly into barrels; bars or tubes, if parts of and shipped with chain link fence, complete or knock down; belt lacing; belt link conveyors; boat spikes; bolts; brads; bright wire goods—screw eyes and hooks, etc.; card clothing; cast iron sash weights if parts of and shipped with complete windows.

Cement coated nails; chains; chain link fence; ceilings (fabricated sheet); clamps, pipe joint; clips, malleable iron, not machined; concrete reinforcement mesh;



Photo by Harris & Ewing

WOMEN IN INDUSTRY: As England girds itself for "total" defense, hundreds of women, like these taking instruction in lathe operation, are replacing men workers.

downspouts (usually galvanized); elevator fronts; expansion joints used in asphalt road making; fair rail anchor; fence gates; flexible metal hose; forged compromise angle joints (railway track accessories); forged tee rail braces (railway track accessories); formed wire; galvanized corrugated culverts; galvanized kettles; grizzly bars; cutters, (usually galvanized); hardware cloth; horseshoe nails.

Insect screen; iron lungs; lock washers; locomotive wheels; morison furnaces; nails; nuts; napper clothing; ornamental work; perforated grills; perforated plates; perforated sheets; perforated sheets or plates; perforated strips; pipe saddle; pipe fittings (16 classifications); bends; cast iron fittings for cast iron pressure pipes; cast iron fittings for cast iron soil pipes; duriron; ells.

Expansion joints; forged steel flanges; forged steel pipe fittings; laterals, cast; malleable iron screwed; nipples; reducers; tees; unions; valves, iron or steel; all other pipe fittings, whether iron or steel; poultry netting; rail braces; railroad clips, machined; railroad car parts; railroad cars and parts, assembled or unassembled (except tanks for installation on cars, whether installed or not); ridge roll (usually galvanized); rivets; road guard; shingles (fabricated ferrous sheet); screws; screw spikes (not railroad); spanish tile (fabricated ferrous sheet); sheet metal work (usually galvanized).

Stampings; steel cooperage hoops, finished; steel discs; steel grinding balls, machined or not; staples; steel sash; steel windows; storage tank appurtenances, if shipped separately; switch rods; tacks; thumbtacks; tires, locomotive and railway car; trays, galvanized iron or steel; tubular steel poles; valves; washers; water tanks (of 10-gallon capacity or less); welded fabric; wheels, locomotive; wire cloth; wire fabric; wire mesh; wire netting; woven wire screen cloth of iron or steel; and fencing and gates (except woven wire fencing).

Pressed Steel Car Co. Strike Ended By Pay Rise

Pittsburgh

• • • A strike of 61 cranemen which early last week affected production at the Pressed Steel Car Co.'s McKees Rocks plant was settled when cranemen voted to accept a 5c. an hr. increase. More than half of the 2500 employees which were made idle by the cranemen's strike returned to work late last week.

Toledo Schools Increase Defense Training By 23%

Toledo, Ohio

• • • Plans for a 23 per cent increase in the national defense training program in Toledo schools has been approved. Two of the schools equipped for heavier type of vocational training are operating now on a 24-hour basis, but plants with national defense contracts rapidly drain the available men from the courses.

Household Equipment Demand Puts Pressure On Mills

• • • Major household equipment items, which in the aggregate have become fairly large users of steel, have for the most part showed a steady upward trend in sales during the past year. Their record is an example of the accelerated rate of production that is occurring in many consumer goods articles, resulting in increased pressure on the steel mills and other suppliers of metals.

Four items of electrical household equipment, on which sales figures have been compiled by the publication, *Electrical Merchandising*, have been selected as indicators of the upward trend in demand for consumer goods in which steel is an important raw material.

Refrigerators—Total sales of electric refrigerators in 1940 were 2,718,714 units compared with 1,840,000 in 1939, a gain of almost 48 per cent, and a gain of more than 17 per cent over the industry's best recent year, 1937, when sales totaled 2,310,000. The sale of refrigerators is seasonal, the first half of the year running higher as a rule than the last half. Last year's peak month was May, with a total of 385,688 units. But January started this year with a total of 376,214 compared with 234,662 in January last year, a gain of 60 per cent. February sales were 333,335 units.

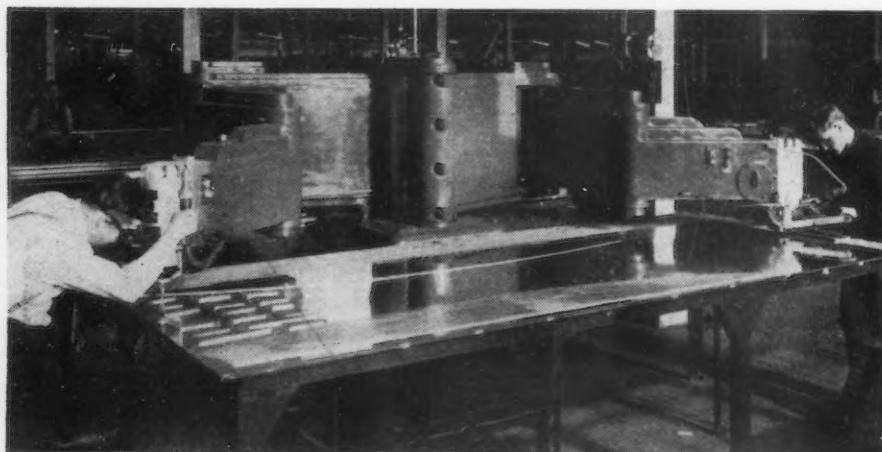
Electric ranges—1940 sales were 404,239 units compared with

340,000 in 1939, a gain of nearly 19 per cent and almost equaling the best recent year for this product—1937 with a total of 405,000. In the first two months of this year electric range sales registered a high rate of gain. The January total was 50,516 units and that for February was 51,790. The total volume for the first two months of this year, 102,306 units, was an increase of 47.4 per cent over the total for the first two months of 1940.

Washing machines—Last year's total sales of both electric and gas engine washing machines was 1,552,666 units compared with 1,320,000 in 1939, a gain of nearly 18 per cent. The best recent year for this branch of the household equipment industry was 1936 when its sales total was 1,528,585 units. The January sales total was 133,411 compared with 119,228 units in January, 1940. The best month last year for these products was October, when the total was 168,527, but that was considerably better than any other month last year.

Vacuum cleaners—This article has not shown sales gains as large as those of the other products named above. Last year's total was 1,384,939 units, which was slightly below the 1,409,500 sold in 1939. The recent banner year for vacuum cleaners was 1937, when units sold totaled 1,706,337. However, January sales this year, totaling 117,408 units, were well ahead of the January figure of last year, 93,053.

A COMBINATION RADIAL ARM router and drill is used in the aircraft division of Hudson Motor Car Co. to cut out and pre-drill aircraft metal sheets in multiple. Sheets are stacked on the table and as many templates, or patterns, as possible nested together on top of the pile. This eliminates necessity for blanking dies and is typical of process being employed in Hudson's aircraft production.



102—THE IRON AGE, April 3, 1941

Steel Industry Taxes

\$210 Millions in '40, Earnings \$260 Millions

By F. T. Turner

• • • Despite the heaviest tax burden in its history, the steel industry in 1940 had its best year in over a decade. Earnings of 22 of the largest companies totaled over \$260,000,000, more than doubling 1939 profits and comparing favorably with earnings in the boom year, 1929. The return was realized without an inflationary movement within the industry; published prices remained unchanged throughout the year. Conversely, certain expenses increased enormously over the previous year. In addition to substantially heavier labor costs, taxes rose impressively. Total taxes paid to Federal, state and local governments by the 22 companies covered by the analysis totaled \$210,000,000, equal to 80 per cent of net income, and 56 per cent heavier than the \$135,000,000 levied in 1939. (The 22 companies have 91 per cent of the total U. S. ingot capacity.)

Most profitable operation occurred in the last quarter of the year, after the national defense program had gotten under way and production could be maintained at capacity levels for an extended period. Early in the year operations had slumped because of general business conditions and a tapering in steel buying by foreign governments. Ingot production for the year was the highest in the industry's history, totaling close to 60,000,000 tons, as compared with 43,000,000 in 1939 and around 25,000,000 in 1938. Operations averaged 84.6 per cent of capacity, as against 67.7 in 1939 and 39.6 in 1938, when the industry lost almost \$10,000,000.

Volume of business handled in 1940 reflected the large-scale buying of practically every type of steel product. Net sales in excess of \$3,000,000,000 represented 77 per cent of total investment, and were 33 per cent heavier than the \$2,300,000,000 worth of business done in 1939. Profit margins varied considerably, but averaged 7.7 per cent of net sales for the 22 companies, as compared with 5.2 in 1939. As can be seen from a glance at the adjoining tabulation, the margin gen-

FINANCIAL ANALYSIS OF THE S

NAME OF COMPANY	1940	Ingot Capacity Net Tons	Ingot Production Net Tons	Operating Rate	Net Sales	Net Income	Profit Margin	Common Shares Outstanding	Common Share Earnings	Earnings Per T In Cap
GROUP 1										
United States Steel Corp.	1940	29,720,000	22,934,000	77.2%	\$998,225,113	\$102,211,282	10.2%	8,703,252	\$8.85	\$3.1
	1939	27,795,000	17,626,000	63.4	801,039,242	41,119,934	5.1	8,703,252	1.83	
Bethlehem Steel Corp.	1940	11,850,000	10,704,741	93.3	602,202,618	48,677,524	8.1	2,984,994	14.04	4
	1939	11,468,800	7,958,636	70.8	414,141,087	24,638,384	5.9	2,984,994	5.75	2
Republic Steel Corp.	1940	8,000,000	6,111,678	76.4	303,303,447	21,113,507	7.0	5,670,628	3.30	2
	1939	7,840,000	4,817,867	61.5	230,340,805	10,671,343	4.6	5,833,066	1.42	1
Jones & Laughlin Steel Corp.	1940	3,943,750	3,338,983	85.0	153,052,249	10,277,029	6.7	576,320	10.70	2
	1939	3,943,744	2,443,064	60.0	113,323,602	3,188,944	2.8	576,320	1.60	0
National Steel Corp.	1940	3,580,000	3,398,209	94.9	157,905,721	15,066,341	9.5	2,204,667	6.83	4
	1939	3,808,000	.....	.....	132,061,908	12,581,636	9.5	2,202,167	5.71	3
Youngstown Sheet & Tube Co.	1940	3,494,400	2,868,902	82.1	143,054,028	10,815,468	7.6	1,675,008	5.96	3
	1939	3,494,400	2,250,394	64.4	117,027,997	5,004,484	4.3	1,675,008	2.50	1
Inland Steel Co.	1940	3,300,000	3,092,100	93.7	142,173,338	14,450,385	10.2	1,628,625	8.87	4
	1939	3,091,200	2,408,045	77.9	115,346,665	10,931,016	9.5	1,624,265	6.73	3
American Rolling Mill Co.	1940	3,030,180	2,093,854	69.1	112,363,529	7,642,714	6.8	2,869,560	1.96	2
	1939	3,030,182	1,960,528	64.7	94,885,663	4,011,909	4.2	2,869,560	0.69	1
Wheeling Steel Corp.	1940	1,960,000	1,670,341	85.2	93,095,627	5,685,848	6.1	569,674	6.64	2
	1939	1,960,000	1,465,987	74.8	85,716,689	5,560,753	6.5	569,617	6.40	2
Colorado Fuel & Iron Corp. ²	1940	1,131,210	815,602	72.1	31,864,811	1,744,869	5.5	563,620	3.10	1
	1939	1,108,800	471,240	42.5	22,095,139	57,564	0.3	563,620	0.10	0
Pittsburgh Steel Co.	1940	1,072,000	804,000	75.0	34,798,430	1,556,000	4.5	508,917	1.35	1
	1939	1,072,557	693,944	64.7	28,570,639	564,870	2.0	504,292	0.60	0
Otis Steel Co.	1940	977,000	.....	.....	29,072,621	717,007	2.5	916,579	0.04	0
	1939	976,640	.....	.....	24,500,022	214,965	0.8	915,909	0.59	0
Lukens Steel Co. ³	1940	714,340	.....	.....	18,751,175	709,488	3.8	317,976	2.23	0
	1939	714,336	.....	.....	11,929,582	83,127	0.7	317,976	0.26	0
Sharon Steel Corp.	1940	560,000	532,000	95.0	21,573,295	1,336,822	6.2	392,331	2.65	2
	1939	560,000	442,400	79.0	16,178,598	255,497	1.6	392,331	0.11	0
Continental Steel Corp.	1940	364,000	.....	.....	18,246,391	778,738	4.3	200,561	3.88	2
	1939	364,000	.....	.....	18,559,294	1,208,200	6.5	200,561	6.02	3
Laclede Steel Co.	1940	283,000	.....	.....	.....	273,485	.....	206,250	1.33	0
	1939	295,355	.....	.....	.....	210,053	.....	206,250	1.02	0
Keystone Steel & Wire Co. ²	1940	276,500	278,535	100.7	13,279,520	1,418,221	10.7	757,632	1.87	5
	1939	264,578	235,219	88.9	11,040,320	897,299	8.1	757,632	1.18	3
Summary, Group 1.	1940	74,659,580	58,642,845	84.6%⁴	2,872,961,900⁵	244,474,730	6.9%⁶	30,746,594	4.91⁷	2
GROUP 2										
Crucible Steel Co. of America	1940	1,055,800	.....	.....	77,689,477	6,230,180	8.0	445,198	10.24	5
	1939	933,408	.....	.....	47,967,538	2,803,596	5.8	445,198	4.79	3
Allegheny Ludlum Steel Corp.	1940	433,020	.....	.....	54,702,998	3,722,107	6.8	1,255,010	2.78	8
	1939	602,000	.....	.....	37,332,141	2,093,518	5.6	1,256,722	1.49	3
Midvale Co.	1940	305,780	.....	.....	.....	3,227,737	.....	2,000,000	16.14	10
	1939	305,782	.....	.....	.....	1,703,771	.....	2,000,000	8.52	5
Rustless Iron & Steel Corp.	1940	75,000	.....	.....	11,583,924	1,275,993	11.0	926,220	1.28	11
	1939	50,400	.....	.....	6,388,496	1,090,876	17.1	886,216	1.13	21
Vanadium-Alloys Steel Co. ⁹	1940	11,400	.....	.....	3,198,030	608,609	19.0	199,903	3.04	5
	1939	44,800	.....	.....	2,822,291	90,890	3.2	200,232	0.45	1
Summary, Group 2.	1940	1,881,000	.....	.....	147,174,429⁵	15,064,626	11.2⁶	4,826,331	6.70⁷	1
Summary, All Producers	1940	76,540,580	58,642,845	84.6%⁴	3,020,136,329¹⁰	259,539,356	7.7%⁶	35,572,925	5.32⁷	
	1939	73,723,982	42,773,324	67.7%⁴	2,331,267,718¹⁰	128,982,629	5.2%⁶	35,685,188	2.41⁷	

1—Net income before dividends and interest on funded debt. 2—Fiscal year ends June 30. 3—Fiscal year ends Oct. 15. 4—Based only on companies reporting production. 5—One company did not report net

sales. 6—Based on companies reporting both sales and net income.

7—After preferred dividend requirements. 8—State and federal income

taxes only. 9—Six months ended Dec. 31. 10—Based on companies

which did not report sales. 11—Before preferred dividends.

YSIS OF THE STEE

Net Sales	Net Income	Profit Margin	Common Shares Outstanding	Common Share Earnings	Earnings Per Ton of Ingot Capacity	Earnings Per Ton of Ing Prod
\$998,225,113	\$102,211,282	10.2%	8,703,252	\$8.85	\$3.44	\$4.2
801,039,242	41,119,934	5.1	8,703,252	1.83	1.48	2.2
602,202,618	48,677,524	8.1	2,984,994	14.04	4.11	4.4
414,141,087	24,638,384	5.9	2,984,994	5.75	2.15	3.3
303,303,447	21,113,507	7.0	5,670,628	3.30	2.64	3.2
230,340,805	10,671,343	4.6	5,833,066	1.42	1.36	2.2
153,052,249	10,277,029	6.7	576,320	10.70	2.61	3.2
113,323,602	3,188,944	2.8	576,320	1.60	0.81	1.1
157,905,721	15,066,341	9.5	2,204,667	6.83	4.21	4.4
132,061,908	12,581,636	9.5	2,202,167	5.71	3.30	3.3
143,054,028	10,815,468	7.6	1,675,008	5.96	3.10	3.3
117,027,997	5,004,484	4.3	1,675,008	2.50	1.43	2.2
142,173,338	14,450,385	10.2	1,628,625	8.87	4.38	4.4
115,346,665	10,931,016	9.5	1,624,265	6.73	3.54	4.4
112,363,529	7,642,714	6.8	2,869,560	1.96	2.52	3.2
94,885,663	4,011,909	4.2	2,869,560	0.69	1.32	2.2
93,095,627	5,685,848	6.1	569,674	6.64	2.90	3.3
85,716,689	5,560,753	6.5	569,617	6.40	2.84	3.3
31,864,811	1,744,869	5.5	563,620	3.10	1.54	2.0
22,095,139	57,564	0.3	563,620	0.10	0.05	0.0
34,798,430	1,556,000	4.5	508,917	1.35	1.45	1.0
28,570,639	564,870	2.0	504,292	0.60	0.53	0.0
29,072,621	717,007	2.5	916,579	0.04	0.73	1.1
24,500,022	214,965	0.8	915,909	0.59	0.22	1.1
18,751,175	709,488	3.8	317,976	2.23	0.99	1.1
11,929,582	83,127	0.7	317,976	0.26	0.12	1.1
21,573,295	1,336,822	6.2	392,331	2.65	2.39	2.0
16,178,598	255,497	1.6	392,331	0.11	0.46	0.0
18,246,391	778,738	4.3	200,561	3.88	2.14	1.1
18,559,294	1,208,200	6.5	200,561	6.02	3.32	1.1
.....	273,485	.....	206,250	1.33	0.97	1.1
.....	210,053	.....	206,250	1.02	0.71	1.1
13,279,520	1,418,221	10.7	757,632	1.87	5.13	5.2
11,040,320	897,299	8.1	757,632	1.18	3.39	3.2
2,872,961,900 ⁵	244,474,730	6.9 ⁶	30,746,594	4.91 ⁷	2.66	3.2
77,689,477	6,230,180	8.0	445,198	10.24	5.90	5.9
47,967,538	2,803,596	5.8	445,198	4.79	3.00	3.0
54,702,998	3,722,107	6.8	1,255,010	2.78	8.60	8.6
37,332,141	2,093,518	5.6	1,256,722	1.49	3.48	3.48
.....	3,227,737	.....	2,000,000	16.14	10.56	10.56
.....	1,703,771	.....	2,000,000	8.52	5.57	5.57
11,583,924	1,275,993	11.0	926,220	1.28	17.01	17.01
6,388,496	1,090,876	17.1	886,216	1.13	21.64	21.64
3,198,030	608,609	19.0	199,903	3.04	53.39	53.39
2,822,291	90,890	3.2	200,232	0.45	2.03	2.03
147,174,429 ⁵	15,064,626	11.2 ⁶	4,826,331	6.70 ⁷	19.09	19.09
3,020,136,329 ¹⁰	259,559,356	7.7 ⁶	35,572,925	5.32 ⁷	6.40	6.40
2,331,267,718 ¹⁰	128,982,629	5.2 ⁶	35,685,188	2.41 ⁷	2.85	2.85

companies reporting both sales and net income.
dividend requirements. 8—State and federal income

taxes only. 9—Six months ended Dec. 31, 19
did not report sales. 11—Before deducting excess

STEEL INDUSTRY - 1

Days of In- gots Pro- duced	Earnings Per Ton of Ingots Produced	Total Assets (000 omitted)	Funded Debt (000 omitted)	Preferred Stock (000 omitted)	Common Stock (000 omitted)	Com- mon Sur- (000 omitted)
2.33	\$4.46	\$1,854,586	\$191,696	\$360,281	\$652,744	\$34,300
3.10	2.33	1,768,524	216,502	360,281	652,744	30,300
3.10	4.55	763,724	185,775	93,389	283,574	9,700
2.21	3.45	732,932	189,887	112,066	283,574	7,700
2.21	3.08	405,318	95,829	37,693	110,411	8,600
1.31	1.31	365,050	87,528	40,190	132,520	6,600
1.31	4.43	240,478	43,199	58,714	57,632	5,500
1.31	4.43	230,865	46,697	58,714	57,632	4,400
1.31	4.43	218,028	65,604	None	55,117	8,000
2.22	3.77	237,350	62,446	None	55,054	7,000
2.22	3.77	247,655	85,500	15,000	105,088	2,000
2.22	4.67	251,239	82,500	15,000	105,074	2,000
2.22	4.54	247,655	85,500	15,000	105,074	2,000
2.05	3.65	173,692	48,200	None	60,755	4,000
2.05	4.54	166,812	51,800	None	60,537	3,000
2.05	3.65	157,022	9,500	45,000	71,739	4,000
2.05	3.65	144,317	2,000	45,000	71,739	4,000
3.79	3.40	130,065	30,800	36,152	28,605	3,000
3.79	3.79	124,021	32,200	37,933	28,603	3,000
0.12	2.14	42,937	15,518	None	5,636	3,000
0.12	0.12	39,747	15,518	None	5,636	3,000
0.81	1.94	48,113	6,029	15,471	4,862	3,000
0.81	0.81	45,794	5,233	15,471	4,816	3,000
....	....	38,106	13,417	10,295	4,583	3,000
....	....	37,543	14,080	10,298	4,579	3,000
....	....	15,105	3,773	None	3,180	3,000
....	....	13,900	3,826	None	3,180	3,000
0.58	2.51	21,013	2,000	5,972	3,975	3,000
0.58	0.58	18,574	550	5,972	3,975	3,000
....	....	16,584	1,600	1,872	5,276	3,000
....	....	15,900	2,000	1,885	5,276	3,000
....	....	8,070	750	None	4,125	3,000
....	....	7,259	750	None	4,125	3,000
3.81	5.09	12,031	1,750	None	3,157	3,000
3.81	3.81	10,354	1,400	None	3,157	3,000
3.63 ⁴	3.63 ⁴	4,415,433	794,782	679,839	1,460,459	82,000
....	....	91,264	16,000	33,432	11,130	1,000
....	....	115,334	10,800	23,880	44,520	2,000
....	....	37,891	None	3,343	7,852	1,000
....	....	33,638	None	3,343	7,854	1,000
....	....	23,085	None	None	10,575	1,000
....	....	17,592	None	None	10,575	1,000
....	....	9,796	2,050	1,189	925	1,000
....	....	6,763	1,750	1,189	885	1,000
....	....	7,007	None	None	1,437	1,000
....	....	5,984	None	None	1,424	1,000
....	....	169,043	18,050	37,964	31,919	4,000
3.63 ⁴	3.63 ⁴	4,584,476	812,832	717,803	1,492,378	86,000
2.24 ⁴	2.24 ⁴	4,366,586	833,625	731,222	1,547,479	76,000

Dec. 31, 1940. 10—Two companies
conducting excess profits tax.

THE STEEL INDUSTRY — 1940

Data
capaci

Common Shares Outstanding	Common Share Earnings	Earnings Per Ton of Ingot Capacity	Earnings Per Ton of Ingots Produced	Total Assets (000 omitted)	Funded Debt (000 omitted)	Preferred Stock (000 omitted)	Common Stock (000 omitted)	Combined Surplus (000 omitted)	Total Investment (000 omitted)	Earnings Invest
8,703,252	\$8.85	\$3.44	\$4.46	\$1,854,586	\$191,696	\$360,281	\$652,744	\$343,961	\$1,548,682	\$115,850,4
8,703,252	1.83	1.48	2.33	1,768,524	216,502	360,281	652,744	301,782	1,531,309	50,4
2,984,994	14.04	4.11	4.55	763,724	185,775	93,389	283,574	96,252	658,990	55,8
2,984,994	5.75	2.15	3.10	732,932	189,887	112,066	283,574	78,229	663,757	31,7
1,670,628	3.30	2.64	3.45	405,318	95,829	37,693	110,411	80,670	344,502	25,3
5,833,066	1.42	1.36	2.21	365,050	87,528	40,190	132,520	66,387	326,625	15,0
576,320	10.70	2.61	3.08	240,478	43,199	58,714	57,632	56,798	215,368	12,3
576,320	1.60	0.81	1.31	230,865	46,697	58,714	57,632	48,380	210,135	5,4
204,667	6.83	4.21	4.43	237,350	62,446	None	55,117	85,744	202,860	16,9
202,167	5.71	3.30	...	218,028	65,604	None	55,054	76,146	196,200	14,9
1,675,008	5.96	3.10	3.77	251,239	82,500	15,000	105,088	27,024	229,612	14,2
1,675,008	2.50	1.43	2.22	247,655	85,500	15,000	105,074	24,023	229,597	8,7
628,625	8.87	4.38	4.67	173,692	48,200	None	60,755	42,566	151,522	16,3
624,265	6.73	3.54	4.54	166,812	51,800	None	60,537	38,516	150,853	12,7
1,869,560	1.96	2.52	3.65	157,022	9,500	45,000	71,739	13,624	139,863	7,9
1,869,560	0.69	1.32	2.05	144,317	2,000	45,000	71,739	10,397	129,136	4,1
569,674	6.64	2.90	3.40	130,065	30,800	36,152	28,605	18,845	116,019	7,1
569,617	6.40	2.84	3.79	124,021	32,200	37,933	28,603	15,445	113,481	7,0
563,620	3.10	1.54	2.14	42,937	15,518	None	5,636	15,409	36,563	2,5
563,620	0.10	0.05	0.12	39,747	15,518	None	5,636	13,382	34,536	8
508,917	1.35	1.45	1.94	48,113	6,029	15,471	4,862	15,911	42,273	1,9
504,292	0.60	0.53	0.81	45,794	5,233	15,471	4,816	14,729	39,748	9
916,579	0.04	0.73	...	38,106	13,417	10,295	4,583	6,014	34,308	1,3
915,909	0.59	0.22	...	37,543	14,080	10,298	4,579	5,285	34,242	8
317,976	2.23	0.99	...	15,105	3,773	None	3,180	4,346	11,261	9
317,976	0.26	0.12	...	13,900	3,826	None	3,180	3,637	10,643	2
392,331	2.65	2.39	2.51	21,013	2,000	5,972	3,975	6,470	18,416	1,3
392,331	0.11	0.46	0.58	18,574	550	5,972	3,975	5,595	16,092	2
200,561	3.88	2.14	...	16,584	1,600	1,872	5,276	5,094	13,841	8
200,561	6.02	3.32	...	15,900	2,000	1,885	5,276	4,778	13,939	1,2
206,250	1.33	0.97	...	8,070	750	None	4,125	1,812	6,687	2
206,250	1.02	0.71	...	7,259	750	None	4,125	1,796	6,671	2
757,632	1.87	5.13	5.09	12,031	1,750	None	3,157	5,589	10,496	1,4
757,632	1.18	3.39	3.81	10,354	1,400	None	3,157	4,864	9,421	9
746,594	4.91 ⁷	2.66	3.63 ⁴	4,415,433	794,782	679,839	1,460,459	826,129	3,781,263	282,7
445,198	10.24	5.90	...	91,264	16,000	33,432	11,130	14,190	74,752	6,3
445,198	4.79	3.00	...	115,334	10,800	23,880	44,520	28,915	108,115	3,3
1,255,010	2.78	8.60	...	37,891	None	3,343	7,852	17,610	28,808	3,7
1,256,722	1.49	3.48	...	33,638	None	3,343	7,854	15,911	27,168	2,0
2,000,000	16.14	10.56	...	23,085	None	None	10,575	3,729	14,303	3,2
2,000,000	8.52	5.57	...	17,592	None	None	10,575	2,299	12,873	1,7
926,220	1.28	17.01	...	9,796	2,050	1,189	925	2,987	7,151	1,
886,216	1.13	21.64	...	6,763	1,750	1,189	885	1,875	5,699	1,
199,903	3.04	53.39	...	7,007	None	None	1,437	4,852	6,288	0
200,232	0.45	2.03	...	5,984	None	None	1,424	4,336	5,760	0
4,826,331	6.70 ⁷	19.09	...	169,043	18,050	37,964	31,919	43,368	131,302	15,0
5,572,925	5.32 ⁷	6.40	3.63 ⁴	4,584,476	812,832	717,803	1,492,378	869,497	3,912,565	298,5
5,685,188	2.41 ⁷	2.85	2.24 ⁴	4,366,586	833,625	731,222	1,547,479	766,715	3,875,940	164,5

taxes only. 9—Six months ended Dec. 31, 1940. 10—Two companies did not report sales. 11—Before deducting excess profits tax.

Data cover the operations of 22 integrated steel companies, representing 91 per cent of the ingot capacity of the United States. All values are as of Dec. 31, unless otherwise noted. Red indicates loss.

Ent ed)	Earnings on Investment ¹	Return on Invest- ment	Invest- ment Per Ton of Ingot Capacity	Preferred Share Require- ments	Preferred Dividends Paid	Common Dividends Paid	Total Taxes Paid	NAME OF COMPANY
GROUP 1								
32 09	\$115,849,432 50,432,865	7.5% 3.3	\$52.11 55.09	\$25,219,677 25,219,677	\$25,219,677 25,219,677	\$34,813,008 None	\$85,420,545 67,017,086	1940 United States Steel Corp. 1939
30 57	55,842,118 31,742,436	8.5 4.8	55.61 57.88	6,537,209 7,471,096	6,770,681 7,471,096	14,924,970 4,775,076	41,345,349 21,191,492	1940 Bethlehem Steel Corp. 1939
32 25	25,366,676 15,038,720	7.4 4.6	43.06 41.66	2,261,607 2,411,403	4,564,149 3,861,164	2,268,251 None	16,034,921 9,561,985	1940 Republic Steel Corp. 1939
38 35	12,368,000 ¹¹ 5,477,764	5.7 2.6	54.61 53.28	4,109,973 4,109,973	2,348,556 None	None None	9,327,344 5,797,715	1940 Jones & Laughlin Steel Corp. 1939
60 00	16,927,205 14,992,546	8.3 7.6	56.66 51.52	None None	None None	5,506,043 3,738,384	12,528,619 6,337,541	1940 National Steel Corp. 1939
12 97	14,266,613 8,744,086	6.2 3.8	65.71 65.70	825,000 825,000	825,000 825,000	None None	5,497,000 4,297,000	1940 Youngstown Sheet & Tube Co. 1939
22 53	16,312,398 12,770,570	10.8 8.5	45.92 48.80	None None	None None	8,141,585 6,473,633	9,209,459 5,158,640	1940 Inland Steel Co. 1939
63 36	7,939,601 4,177,860	5.7 3.2	46.16 42.62	2,025,000 2,025,000	3,262,546 1,800,000	717,159 None	4,734,425 3,046,873	1940 American Rolling Mill Co. 1939
19 81	7,151,650 7,041,646	6.2 6.2	59.19 57.90	1,912,844 1,912,959	2,283,103 2,360,913	None None	4,001,714 3,202,912	1940 Wheeling Steel Corp. 1939
63 36	2,520,779 836,506	6.9 2.4	32.32 31.15	None None	None None	None None	1,664,593 1,115,897	1940 Colorado Fuel & Iron Corp. ² 1939
73 48	1,940,675 945,371	4.6 2.4	39.43 37.06	869,162 869,162	None None	None None	1,458,736 1,015,437	1940 Pittsburgh Steel Co. 1939
08 42	1,368,358 879,215	4.0 2.6	35.12 35.06	754,958 755,183	None None	None None	1,097,431	1940 Otis Steel Co. 1939
61 43	919,148 294,512	8.2 2.8	15.76 14.90	None None	None None	None None	180,400 ⁸ 7,730 ⁸	1940 Lukens Steel Co. ³ 1939
16 92	1,365,246 296,858	7.4 1.8	32.89 28.74	298,600 298,600	298,600 298,600	98,083 None	829,487 357,364	1940 Sharon Steel Corp. 1939
41 39	837,603 1,273,193	6.1 9.1	38.02 38.29	131,005 131,985	131,303 148,418	300,842 401,122	807,000 791,000	1940 Continental Steel Corp. 1939
87 71	273,485 210,053	4.1 3.1	23.63 22.59	None None	None None	257,813 206,250	103,844 ⁸ 36,827 ⁸	1940 Laclede Steel Co. 1939
96 21	1,474,855 961,633	14.1 10.2	37.96 35.61	None None	None None	643,987 416,698	544,857 410,448	1940 Keystone Steel & Wire Co. ² 1939
263	282,723,840	7.2	43.19	44,945,035	45,703,615	67,671,741	194,785,720	1940 Summary, Group 1
GROUP 2								
52 15	6,810,953 3,390,374	9.1 3.1	70.80 116.57	1,671,600 1,671,600	835,800 None	None None	5,543,602 2,329,717	1940 Crucible Steel Co. of America 1939
08 08	3,722,107 2,093,518	12.9 7.7	66.53 45.03	233,982 233,982	233,674 233,639	1,882,163 625,737	3,799,608 1,509,019	1940 Allegheny Ludlum Steel Corp. 1939
03 73	3,227,737 1,703,771	22.6 13.2	46.78 42.10	None None	None None	1,797,875 1,298,414	3,650,000 ⁸ 865,000 ⁸	1940 Midvale Co. 1939
51 99	1,322,469 1,110,262	18.5 19.5	95.35 113.08	91,280 91,280	91,291 91,292	555,735 221,562	1,454,165 369,360	1940 Rustless Iron & Steel Corp. 1939
288 70	608,609 90,890	9.7 1.6	551.58 128.58	None None	None None	349,515 50,084	296,971 94,269	1940 Vanadium-Alloys Steel Co. ⁹ 1939
302	15,691,875	14.6	166.21	1,996,862	1,160,765	4,585,288	14,744,346	1940 Summary, Group 2
65 40	298,415,715 164,504,649	8.8% 5.6%	71.15 52.87	46,941,897 48,026,900	46,864,380 42,309,799	72,257,029 18,206,960	209,530,070 134,513,312	1940 Summary, All Producers 1939



erally was higher among those producers of special steel in Group 2 than among those devoting the bulk of their production to regular carbon grades.

Net income for all the companies equaled \$6.40 per ton of ingot capacity and \$3.63 per ton of ingots produced, as compared with \$2.85 and \$2.24 respectively in 1939. Income was higher on a capacity than a production basis because the capacities of all companies were available, whereas in the smaller group, where earnings per ton of ingot capacity produced is relatively high, no companies released production figures.

Taxes have become an increasingly important expense to be reckoned with by the industry in recent years and promise to become more so in the future. All taxes equaled \$5.89 a share of common stock in the past year as compared with \$3.77 in 1939. They represented \$3.57 for every ton of ingots produced, as against \$3.14 in 1939.

Most companies had no difficulty in meeting preferred share requirements, some being able to pay off part of accumulated back dividends as well as pay something on common stock. Dividends on preferred stock were paid in the amount of \$46,864,380, as against requirements of \$46,941,897, whereas in 1939 about 12 per cent of preferred shareholders received no remuneration.

Common stockholders fared better in 1940 than they had in some time, although a number of companies were still unable to distribute to such shares after meeting fixed charges. Total common dividends of \$72,000,000 constituted less than 35 per cent of taxes, although they were considerably in excess of the \$18,207,000 paid in 1939. Return on investment, before payment of charges on indebtedness, was 8.8 per cent, as compared with 5.6 per cent in 1939 and an average of 5.5 per cent during the period from 1920 through 1929. Earnings on total investment were \$298,416,000, over 81 per cent greater than total earnings in 1939 of \$164,504,649.

Total assets increased about 5 per cent to \$4,584,000,000 in 1940, as compared with \$4,367,000,000 in 1939.

Institute Tells How Steel Aids Defense

• • • The American Iron and Steel Institute has issued a pamphlet on steel in national defense, which gives in question and answer form many pertinent facts relative to the ability of the steel industry to meet the maximum requirements of the defense program while at the same time supplying steel to Great Britain, Canada and other democratic nations.

Some of the interesting facts regarding the industry's capacity to meet all the demands that may be put upon it are given as follows: "Rated" capacity of more than 84,000,000 tons of ingots as of the end of 1940 was 44 per cent of the world's steel making capacity. This capacity is almost 40 per cent more than that which existed in 1918 and fully 15 per cent more than the 1929 capacity. Gains in steel making capacity have far outstripped population gains, the nation's present population being only 8 per cent more than in 1929 and 27 per cent more than in 1918. Last year's additions to capacity total 2,500,000 tons and this year's additions will total about 3,400,000 tons.

Stating that the industry probably could produce as much as 86,000,000 tons of ingots this year and in 1942 could probably produce 90,000,000 tons, the institute asserts that such production will be more than ample for defense needs, for exports and for other needs.

"How can any company operate at more than 100 per cent of its rated capacity?" the institute asks, and then answers this question as follows: "The reason is that the 'rated' capacity of the industry is the sum total of maximum output attained in any recent year by each furnace in the industry, less about 11 per cent which is taken off for shutdowns and repairs. Thus the 'rated' capacity is not the production ceiling. As a practical matter the industry could, by reducing the length of the shutdowns, lift output as much as 2.5 per cent above its 'rated' capacity in a year.

"It is estimated," says the institute, "that when the defense program gets in full swing, a total of 8,000,000 tons may be used for

defense in a year, and another 12,000,000 tons for export to Great Britain, Canada, South America and other countries—about 20,000,000 tons in all. That would leave at least 66,000,000 tons of which could be turned out for domestic civilian use."

Commenting on defense uses of steel, the institute points out that a 45,000-ton battleship requires about 20,000 tons of ordinary steel, an aircraft carrier about 17,000 tons, a cruiser about 5500 tons and a destroyer about 17,000 tons. These tonnages do not include the steel in the ship's guns and defensive armor.

To build one of the larger planes, like a transport or heavy bomber, requires at least five tons of high speed alloy steels.

As to whether there have been shortages in particular kinds of steel, the institute says, "The answer is 'no'—for the main body of steel products but 'yes'—for a few special kinds of steel such as stainless steel and high speed tool steel."

Sitdown Starts In Ford Company's Steel Plant

Detroit

• • • From 5000 to 6000 employees at the Ford Motor Co.'s rolling mills staged a sitdown strike on Tuesday afternoon. A spokesman for the company told newsmen: "You had better contact the union for information on the strike."

500 Steel Workers Given 5c. Pay Raise, Check-Off

Parkersburg, W. Va.

• • • Parkersburg Iron & Steel Co., employing 500 workers here, has signed a new contract with the SWOC granting a 5c. an hour wage increase, a closed shop, and the check-off. The agreement terminates a 5 day strike.

Tungsten Ore Shipments Arrive Cleveland

• • • Receipts of high grade tungsten ore have been maintained here recently. Three hundred tons arrived from Bolivia several weeks ago, followed by about 300 tons from China. The ore, which contains 66 to 67 per cent WO₃, is used principally in the manufacture of fine wire.

Search For Nickel Substitutes Widens

Washington

• • • Trade associations representing the steel and metal industries were urged last week by the Advisory Committee on metals and minerals, National Academy of Sciences, to study measures to conserve nickel supplies and encourage users of nickel products to find appropriate substitutes.

At the same time the OPM asked the Academy to broaden its advisory service to include investigations on possible substitutes for aluminum, magnesium, chrome, tin, tungsten, zinc, graphite, lead and beryllium. In connection with the magnesium inquiry, a finding by the minerals and metals group of the Priorities Division that a shortage of magnesium exists, last week prompted the Priorities Division to expand and strengthen the priority control previously imposed on magnesium on March 3.

Edward R. Stettinius, Jr., also took action to make 200 tons of American magnesium available to Great Britain. He ordered the Dow Chemical Co. to deliver that amount to Great Britain during March. The move to tighten priority control over magnesium automatically will subject it to a preference rating of A-10, the effect of which will be to place all defense needs ahead of any civilian requirements. The division, however, can subsequently assign preference ratings to non-defense and civilian orders depending upon the circumstances involved at some later time.

The OPM's decision to ask that additional studies be undertaken by the Academy's special committee came after the committee earlier in the week sent to OPM's materials branch, division of production, a preliminary report covering measures to conserve nickel supplies and to encourage users of nickel products to find substitutes. It was this same committee which on Feb. 21 recommended in a report to the OPM the use of spiegel as a substitute for ferromanganese and the emergency conservation of manganese through consumer-producer cooperation.

In its report on nickel the com-

mittee said that the most important step in the intelligent conservation of nickel supply is the inauguration of a plan for deferring deliveries of such products as are not urgently needed. It reported that this is being done through the cooperation of primary suppliers of nickel products and government purchasing agencies. Other steps are being contemplated, the committee said, re-

"nickel year" prior to 1939. Building up of finished goods and process inventories (the amount of nickel in various stages of fabrication) undoubtedly is an active factor in the situation.

Possibilities to be investigated by the committee as a result of the OPM request will include, in the case of tin, conservation in the can, collapsible tube, babbitt and solder industries. Conservation in bronzes also will be studied. Substituting molybdenum or other metals for tungsten, as well as the conservation of tungsten use, will be investigated.

In surveying possible savings in zinc, the committee will consider a general reduction in the use of zinc in galvanizing steel sheets and possible changes in the formula of various types of brass to increase the copper and lower the zinc content. Substitutes for graphite crucibles and reports for nonferrous work, graphite crucibles for iron and steel and graphite stoppers for steel ladles will be under scrutiny. The OPM said that it had asked particularly concerning substitutions including iron and clay-lined iron pots, and clay stoppers.

In its study of lead, the committee noted that in view of the shortage of magnesium and the increasing need for magnesium in debismuthizing, there will be decreased production of high grade corroding lead. In this connection the committee will seek to determine the possibilities of using leads of higher bismuth content than are now demanded in various industries, or by correcting the situation by other means.

On the West Coast

(CONCLUDED FROM PAGE 65)

Shipbuilding Co., Portland, for \$46,500,000, and a like number to the California Shipbuilding Co., Los Angeles. These awards to these affiliated firms had been anticipated, and further awards are expected to follow as these contracts get under way. The general sentiment on the Coast is that ship contracts will be awarded as fast as the vessels can be built and that the naming of numbers is merely for the record.

Douglas Aircraft Co. has an-

U. S. Plane Plant Floor Space Up 28% Since First of Year

• • • The American aircraft industry, working under the spur of national defense needs and British aid requirements, increased its productive facilities 28 per cent in January and February. Col. John H. Jouett, president, the Aeronautical Chamber of Commerce of America, this week reported that 24,122,230 sq. ft. of productive space was being used in plane, engine and propeller plants, compared with 18,782,879 sq. ft. on Jan. 1. During the same two months 27,261 more shop employees were hired, bringing the total of shop employees in plane, engine and propeller plants to 173,076.

porting that because of mounting defense requirements even the enhanced supply of nickel is at least temporarily inadequate to meet current demands of nickel users.

"Nickel is being currently supplied to the United States market at a rate more than double that of any year prior to 1939—at a monthly rate of about 14,500,000 lb., as compared to 6,900,000 lb. in 1937," the report said. "Nevertheless, in consequence of mounting United States and British defense requirements as well as of sharply increased industrial requirements during recent weeks, even this enhanced supply is temporarily, at least, inadequate to meet the current even larger demands of nickel users.

United States and British defense requirements as currently estimated, do not adequately account for this current accumulated demand, which is almost triple that of 1937—the largest



AT DETROIT: Chrysler's tank arsenal north of the city will be completed in April with tanks coming off the assembly line in early fall. Installation of machinery has begun in this important plant, which is 1380 x 500 ft.

nounced that it will inaugurate the council management system. Five management groupings will coordinate production in the four Douglas plants and supervise marketing activities. The new advisory councils are an executive council headed by Donald W. Douglas; a new products council; a plant loading council which will supervise allocation and subcontracting; a basic price council; and an employee relations council. Chairmen of these councils will make all final decisions and determine policies. Members will furnish information and advice.

Twenty representative airplane engine and propeller companies spent \$37,903,180 for purchases during January, 1941, an increase of 180 per cent over the \$13,527,907 spent during January, 1940, according to the Aeronautical Chamber of Commerce of America.

These plants expect to spend more than \$70,000,000 a month by mid-summer, almost doubling their January, 1941, purchases—or an increase of more than 400 per cent in 18 months from January, 1940, to July, 1941. Douglas Aircraft Co. alone expects to spend approximately \$9,000,000 a month for materials.

Northrop Aircraft occupied a new \$500,000 assembly and shop building last week 20 days ahead of construction schedule. Two years ago this company occupied a small remodeled hotel building with a staff of six employees. Today, it occupies 555,000 sq. ft. of floor space and has 2500 employees.

Washer, Iron Shipments Hit Record In February

• • • Household washer and ironer shipments again broke all records for the month in February. Washers aggregated 155,546, an advance of 9.29 per cent over 142,318 a year ago and topping the all-time February mark, set in 1937, by 4.02 per cent, according to Joseph R. Bohnen, executive secretary-treasurer of the American Washer and Ironer Manufacturers' Association.

Basic Dolomite Changes Name

Cleveland

• • • Stockholders of Basic Dolomite, Inc., Cleveland, have approved a change in the name of the company to Basic Refractories, Inc.

The new name, it was announced, is being adopted to reflect better the widened scope of activities of the company, whose business in recent years has grown from that of supplying a complete range of dolomite products to cover the much broader field of basic refractories for the steel industry. Magnesite and certain chrome products are recent additions. Company now has completely integrated facilities for the production of its many products, including important magnesite and brucite mines in the west and modern manufacturing plants at Maple Grove and at Bettsville, Ohio, not far from Tiffin.

Dues Collectors Close Babcock Plant A Day

Beaver Falls, Pa.

• • • An SWOC dues collection campaign here forced the shutting down of the Babcock & Wilcox Tube Co. plant for 24 hr. last week. Approximately 95 per cent of the company's present contracts are defense materials, according to company officials.

The shutdown was purely the result of an organizational and dues collection drive, there having been no controversy between the company and the union, according to a company spokesman.

Vital Statistics On The Cost of Defense

U. S. defense expenditures, authorized and proposed, to date	\$39,177,800,000
Treasury defense expenditures, from June 1, 1940, to March 17, 1941	3,452,000,000

Farmers Leave as Big Gun Testing Begins

Madison, Ind.

• • • Big guns will start booming about April 15 on the government 60,000 acre proving ground here. Field pieces have already been delivered and firing tests will start before all construction is completed. The 19 farm families remaining on the tract received orders to evacuate by April 1.

Universal Cyclops Steel Strike Ends, Wage Up 5c

Bridgeville, Pa.

• • • By a vote of three to one, Universal Cyclops Steel Corp. employees returned to work early this week, ending a six weeks walkout over wage disputes. All hourly, incentive and tonnage job employees are to receive a 5c. an hour increase. A survey is to be made, the ultimate goal being to match average wage classifications in other steel mills in this area. All employees whose base rate does not eventually come under a readjustment as the result of this survey, are to be granted a 1½c. an hour increase in addition to the general 5c. an hour boost.

In case the majority of steel companies in the Pittsburgh district receive a pay increase as the result of SWOC-U. S. Steel negotiations, Universal Cyclops workers will receive any amount which is in excess of the general 5c. an hour increase granted to them by their company. If a wage increase granted as the result of current SWOC negotiations is less than 5c. an hour, the wage increase granted by the Universal Cyclops Steel Corp. shall remain at 5c. an hour.

The six weeks old strike, classified as an obstacle to the defense program, was settled late last week by conferences of company, union, and OPM officials, the agreement coming one day before the national mediation board was to have taken action. Employees referendum was taken late last Saturday night and Sunday morning.

Production of national defense material was to begin early this week. Finished products had been loaded and shipped by voluntary action of striking Amalgamated Iron, Steel & Tin Workers.

Strike at Bethlehem's Cambria Plant Over

Johnstown, Pa.

• • • Striking SWOC workers who objected to employee representation plan elections at Bethlehem Steel Co.'s Cambria plant here returned to work early this week on substantially the same terms which

ended the strike in Bethlehem, Pa., last week.

The union had claimed the walkout involved 80 per cent of the company's 15,000 employees. This figure was disputed by company officials who asserted "operations had not been affected to that extent."

Bethlehem officials withheld comment except that R. E. Hough, general manager, said, "It is gratifying the difficulties are over. We are ready to proceed in force with every phase of our production activities with a full complement of workers. The public service of the conciliators in forestalling interruptions to the national defense program deserves the highest praise, not only of those immedi-

SWOC Strike Delays Plane Plant 30 Days

• • • Far-reaching effects of the recent two-day strike at the Bethlehem Steel Co.'s Lackawanna plant are visible in construction of the Curtiss airplane manufacturing plant at Buffalo. Scheduled to be completed in mid-May, the plant will not be ready for occupation until mid-June, due to a holdup in shipments from the Bethlehem mill.

ately involved, but likewise of the nation as a whole."

The strike, which at least partly crippled production at the Johnstown plant, was accomplished without a picket line and resulted in no disorder. According to the local police, no arrests or complaints were made.

Heat-Treating Furnace Sales Push Up In 1940

• • • Sales of heat treating, fuel-fired furnaces to steel mills in 1940 covered 298 units, valued at \$6,416,774, compared with 165 units at \$3,945,369 in 1939, and 79 units at \$1,185,298 in 1938, according to the Industrial Furnace Manufacturers Association, Inc., New York. Electric heat-treating furnaces sold in 1940 included 2880 units at \$8,238,613, against 1713 units at \$2,928,774 in 1939, and 1782 units at \$1,119,440 in 1938.

TNEC Proposes Law Prohibiting Use Of Basing Point System

Washington

• • • Congressional legislation declaring that the basing point pricing system is illegal is unanimously recommended by the Temporary National Economic Committee in its final report, made public on Tuesday.

The committee said that basing point systems are used in many industries as effective devices for eliminating price competition, and that the elimination of such systems under existing law would involve a costly process of prosecuting separately and individually many industries and place a heavy burden upon antitrust enforcement appropriations.

The committee lists iron and steel, machinery and cement among the industries using the basing system. It says that during the past 20 years these systems and variations of such systems, "known technically as 'zone pricing systems' and 'freight equalization systems,' have spread widely in American industry."

Because such systems have resulted in uneconomic and often wasteful location of plant equipment, the report said, it is recognized by the committee that the abolition of basing point systems should provide for a brief period of time for industries to divest themselves of the "monopolistic practice." Continuing the report said:

"The committee is not impressed with the argument that a legislative outlawing of basing point systems will cause disturbances in the rearrangement of business through a restoration of competitive conditions in industries now employing basing point systems. Such disturbances may be costly to those who have been practicing monopoly. But the long-run gain to the public interest by a restoration of competition in many important industries is clearly more advantageous."

A long list of recommendations is made by the committee. Frequently there are dissenters. The report was submitted by Senator

Michigan Defense Plant Strikes Ended

Detroit

• • • Settlement of the Midland Steel Products strike which had halted production at the Lincoln division of Ford Motor Co., slowed production in other plants including some General Motors factories and Chrysler, and threatened to tie up most of the automobile industry, came Saturday, just as an agreement was reached to end a strike at Federal Motor Truck Co., which has \$5,000,000 worth of defense orders. At the same time, an inter-union quarrel about jurisdiction in setting up machines in the new Chrysler tank arsenal was settled. This ends the only Michigan strikes which were holding up defense work, although others are threatened at Republic Aircraft Products Corp., Detroit, the Frost Gear and Forge Co., Jackson, and E. H. Sheldon & Co., manufacturers of laboratory equipment, at Muskegon. In addition, the CIO embroilment with Ford Motor Co. is still a sore spot that threatens momentary eruption.

O'Mahoney, chairman of the TNEC.

Full approval of the committee is given the declaration that recommendations made "for the maintenance of a competitive productive system and a free market place should have a salutary effect in passing on the gains of technology to all who participate in our economic life."

The section of the report devoted to technology contains a personal statement of A. Ford Henrichs, submitted for Isador Lubin, Commissioner of Labor Statistics, a member of the committee, who points out that now is the time to institute certain changes "which will ameliorate conditions in the post-defense period."

To this end Mr. Lubin recommended that industry and labor develop joint studies of the means of effecting technological change with minimum hardship to the workers involved and develop such practices as advance notices of dismissal in labor contracts, the payment of dismissal wages and training program for technologically displaced workers.

Dealing with decentralization of industry the committee said its investigators offer ample evidence of the dangers of size and concentration of plants and industries.

"We therefore submit to all public and private bodies responsible for industry location the desirability of decentralizing industry to the end that the maximum economic benefits can be secured from plants operated at their most efficient size, the depressing aspects of the factory system be prevented, and the American way of life be preserved," the report said.

In a brief reference to curtailment of production and the stimulating of competition, the committee said that the basic solution of curtailed production for selfish ends is to be found in the development of competing industries and firms. In this period of government aid for defense purposes, the committee reported, it is urged that the Congress and the President allocate funds in such a manner that monopoly control of basic products be eliminated to insure an adequate supply at competitive prices, so that competition may develop which will prove effective in the peacetime period following the defense effort.

With three members dissenting, the committee endorsed the principle of national standards for national corporations and recommended that Congress enact legislation to this effect. This proposal would take the form of a Federal licensing law for corporations. Senator O'Mahoney long ago introduced a bill for such licensing. Those dissenting from this proposal were Representative Reece of Tennessee, Sumner T. Pike of the Department of Justice and Joseph J. O'Connell, Jr., special assistant to the general counsel. They pointed out that it is not clear whether statutory prohibition of certain corporate practices are envisaged or whether complete charters for national corporations are contemplated or both. Other objections are stated but the Messrs. Reece, Pike and O'Connell explain that they are not opposed to legislation which would outlaw specific corporate practices "which have been proved to this committee to facilitate the undue concentration of economic power."

Struck Harvester Plants Again Operate

Chicago

• • • The successful reopening of the McCormick works and the Richmond, Ind., plant of International Harvester Co. is regarded as ending the CIO strike in the farm equipment industry. The McCormick works were opened March 24, two days after a ruling by Judge John C. Lewe, Superior Court, restraining mass picketing and violence. The court's order reduced the pickets from 600 to not more than 10 to a gate, for a total of not more than 100. The next day, Harvester announced in a paid newspaper advertisement that the plant would reopen for those who wished to return to work.

The first day 3200 out of close to 6500 workers returned to plant payrolls. Immediately officials of the Farm Equipment Workers' Organizing Committee raged that a call to all CIO members in the Chicago area would bring sympathy pickets in the numbers of 15,000 to 20,000 out the next day to again close McCormick works. But less than one fourth of that estimate showed up, and on the second day 3800 were back to work. The third day saw 4200 ringing the time clock. And the fourth consecutive day saw about 80 per cent of the regular force again turning out.

Almost simultaneously, Harvester's Richmond, Ind., plant was reopened on March 27.

U. S. Steel Wage Talks With Union Continue

Pittsburgh

• • • Carnegie-Illinois Steel Corp. and SWOC officials continued their wage discussions this week. Both sides agreed late last week to move the deadline on negotiations up to April 8 in case no agreement was reached before that time. The previous deadline had been April 1.

Crucible Steel Co. has offered to increase wages 6c. an hour for some of its rolling mill employees at Jersey City, N. J., ending a dispute with the SWOC. The agreement provides that the increase will not affect any general wage advance.

Maximum Zinc Scrap Prices Established

Washington

• • • Zinc scrap and secondary slab zinc early this week became the subject of the third price schedule to be promulgated by the Price Stabilization Division under an order issued by Director Leon Henderson which fixes the maximum price at which zinc scrap materials and secondary slab zinc may be sold.

Prices for zinc scrap materials are delivered or f.o.b. prices depending upon the kind and grade involved. Prices for secondary slab zinc in carload lots were established on an f.o.b. East St. Louis basis but Mr. Henderson warned against interpreting this action as approval or disapproval of the basing point system in the industry.

"The purpose of Price Schedule No. 3 is to bring the prices of secondary zinc into line with the prices of primary zinc," Mr. Henderson explained. "For this purpose we took the practice of the industry as we found it."

Under the price schedule, if secondary slab zinc of Prime Western grade is sold and delivered in carload lots to a buyer in New York, the maximum price that may be charged, regardless of the seller's location, is 7.25c. plus freight from East St. Louis to the buyer's customary rail receiving point in New York.

Like the two other price schedules issued to date—covering sec-

ond-hand machine tools, aluminum scrap and secondary aluminum ingot—the zinc schedule requires complete records of purchases, and information on the movement of zinc scrap materials into the hands of persons other than distillers and remelters. In this connection galvanizers, brass mills or foundries which purchase 4000 lbs. or more of zinc scrap in a week were required to report such purchase to the Price Stabilization Division. Thereafter the requirement calls for weekly reports of all purchases regardless of the amount involved.

Walker Is Subcontractor Coordinator at Pittsburgh

• • • A. E. Walker, president of National Supply Co., has been appointed Pittsburgh district coordinator for the Defense Contract Service. He will direct the program to encourage defense order subcontracting in that area.

Follansbee Sales Up 33%

Pittsburgh

• • • The dollar volume of Follansbee Steel Corp.'s shipments so far this year exceed by 33 per cent those of the last period of 1940, according to John Follansbee, chairman, in a report at the company's annual meeting of stockholders.

Mr. Follansbee also announced that the company's modernization program is now completed and that operations are approaching capacity. All directors were reelected.

Maximum Prices for Zinc Scrap Materials

Grade	Price, per lb.
New Zinc Clippings and Trimmings	6.75c., delivered buyer's plant
Engravers' and Lithographers' Plates	6.75c., delivered buyer's plant
Old Zinc Scrap	5.10c., delivered buyer's plant
Unsweated Zinc Dross	5.10c., f.o.b. point of shipment
Die Cast Slab	4.95c., f.o.b. point of shipment
New Die Cast Scrap	4.60c., f.o.b. point of shipment
Radiator Grilles, old and new	4.60c., f.o.b. point of shipment
Old Die Cast Scrap	4.25c., f.o.b. point of shipment

The prices herein established are the maximum to be paid after free iron and other foreign materials are removed.

Maximum Prices for Secondary Slab Zinc

Grade	Price, carload lots (per lb., delivered buyer's customary rail receiving point)
Prime Western or poorer grade	7.25c.
Brass Special	7.35c.
Intermediate	7.50c.
Plus carload freight from E. St. Louis to buyer's customary rail receiving point.	
Grade	Price, less than carload lots (per lb., f.o.b. seller's plant or warehouse)
Prime Western or poorer grade	8c.
Brass Special	8.10c.
Intermediate	8.25c.
Plus carload freight from E. St. Louis to sellers plant or warehouse. The grade of secondary slab zinc is to be determined in accordance with A.S.T.M. specifications for primary slab zinc.	

Sheet & Tube Settles Back Pay Claims for \$170,000

• • • Settlement of the Labor Board case against Youngstown Sheet & Tube Co. finds the SWOC accepting less than half the sum it sought in back pay claims arising from the 1937 strike. Under the agreement signed here last week-end, which completely disposes of all union charges brought against the company, around \$170,000 will be paid in full settlement of back pay claims, instead of the \$400,000 which the union claimed. The agreement averted costly legal fees and time losses which would have been necessary if prolonged hearings had been held.

It is understood that only a small number of men (somewhere between eight and 20) will be returned to work since a majority of the 266 individuals involved in the union charges had already been reinstated long ago. The company and the union agreed that some individuals should not be returned.

Announcement of the agreement was made by Oscar S. Smith, director of the NLRB regional board at Cleveland, who late last week was appointed to an assistant directorship of divisional field offices for the NLRB.

At the same time, Smith ventured the opinion that the framework had been laid for settlement of back pay claims from Republic Steel Corp. as a result of the 1937 "Little Steel" strike and that before long an announcement of the disposition of these claims could be expected. He estimated the amount would be somewhere around \$2,000,000.

40c. Minimum Wage Set for Enameling Utensil Industry

Washington

A minimum wage of 40c. an hour for the enameled utensil industry, as recommended by the industry committee, has been approved by Wage-Hour Administrator Philip B. Fleming. It will become effective April 21. Twenty-eight plants in the industry, of which 17 are said to manufacture enameled utensils as a major product, are affected.

**Vanadium Strikers
Return to Their Jobs**
Bridgeville, Pa.

• • • Approximately 400 workmen at the Vanadium Corp.'s plant here went back to work early this week following a seven-weeks' strike over a dispute involving the hiring of six non-union plant guards.

The National Defense Mediation Board settled the strike early this week following a conference between company and union officials. All Vanadium workers including the six members of the strike committee returned to work. Hearings will be held by the mediation board here soon when testimony will be taken from union and company officials. Among witnesses expected are A. J. Federoff, CIO regional director who denounced the Vanadium strike as outlaw, and Frank Pugne, president of the local union who defied CIO orders but agreed to the National Defense Mediation Board request. The company had previously refused to rehire Pugne and five other strike leaders and this previous refusal will come up for examination at the subsequent hearing.

**Army, Navy Contracts
Nearing \$12 Billion**

Washington

• • • A compilation made by OPM's bureau of research and statistics shows that as of March 8 Army and Navy contracts awarded under the defense program totaled \$11,884,000,000. Army contracts totaled \$5,900,500,000 against an authorized program of \$7,098,000,000. Navy awards totaled \$5,983,500,000 as against an authorized program of \$9,266,000,000.

Below is a breakdown of the fig-

**38.9% Increase Seen
In Steel Loadings**

Washington

• • • Railroad loadings of iron and steel for the second quarter of 1941 are estimated by the 13 Shippers' Advisory Boards at 535,792 cars, an increase of 38.9 per cent over actual loadings of 385,629 cars in the second quarter of last year. Coal and coke loadings are estimated at 1,816,040 cars, an increase of 10.6 per cent; ore and concentrates at 748,895 cars, an increase of 35.3 per cent, and machinery and boilers at 39,256 cars, an increase of 27.3 per cent.

ures by classification of awards, in millions of dollars.

**Steel Employment Equals
Highest Figure in History**

• • • Employment in the steel industry rose sharply during February to equal the highest figure ever recorded in the industry, according to a report released today by the American Iron and Steel Institute.

More than 603,000 employees were at work in steel mills during February, a total exactly equaling the previous peaks established in August and September, 1937. In January of this year, steel employment averaged 598,000 while in February a year ago an average of 538,000 was employed.

Reflecting the short month, total steel payrolls of \$89,586,000 in February were down somewhat from the total of \$96,234,000 paid out in January. In February, 1940, payrolls of the industry totaled \$70,847,000.

Wage-earning employees in the industry earned an average of 86.9c. per hour in February, com-

pared with 86.6c. in January and 83.4c. in February of last year.

An average of 39.4 hr. per week was worked by wage earners in February, as against 39.2 hr. per week in the preceding month and 34.1 hr. per week in February, 1940.

**Machine Tool Accessory
Plants Earn 11.7% In '39**

Washington

• • • An average net profit of 11.7c. for every dollar of sales was made in 1939 by seven machine tool accessory and machinists' precision manufacturers who represent the more important concerns in this industry, according to the Federal Trade Commission. This net remained after deduction of items listed as expenses, together with provisions of uncollectible accounts, from the gross margin of sales, plus other operating revenue. The seven corporations included in the survey reported consolidated sales of \$42,525,947 or approximately 34 per cent of the total sales of the industry. Of the total sales of the seven corporations, \$34,268,515 or 80.6 per cent represented domestic sales and \$8,257,432 or 19.4 per cent represented export sales. The average total capital of the corporations was \$36,468,929.

**\$2,466,512 Navy Job to
Crucible Steel Co.**

Washington

• • • Crucible Steel Co. of America, Harrison, N. J., has been awarded a \$2,466,512 contract by the Navy Department for the construction and installation of special plant facilities, including an expansion of existing buildings, machinery, machine tools and other facilities.

**T.C.I. Awards New Plate
Mill Contract to Mesta**

Birmingham

• • • Tennessee Coal, Iron & Railroad Co. had awarded a contract for a wide plate mill to Mesta Machine Co. The mill is expected to be used in production of light armor plate.

	Total	Army	Navy
Airplanes, engines and accessories	\$ 2,312.1	\$2,096.7	\$ 215.4
Guns, ammunitions and armor	1,972.4	1,631.6	340.8
Industrial construction	1,191.1	762.7	428.4
Ship construction	4,449.3	...	4,449.3
Other construction	900.3	434.0	466.3
Transport equipment, Q.M.C.	223.4	223.4	...
All other supplies and equipment	835.4	752.1	83.3
Total Contract Awards (a)	\$11,884.0	\$5,900.5	\$5,983.5
Enacted Program (a)	\$16,364.0	\$7,098.0	\$9,266.0
Percentage of Program Covered by Contract Awards	72.6	83.1	64.6

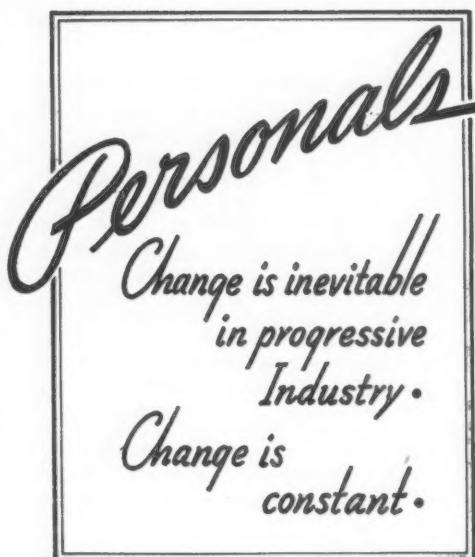
(a) Does not include pay and subsistence of the armed forces.

• **S. H. Hammond**, until recently manager of the appliance division of the Whiting Corp., Harvey, Ill., has been put in charge of all Whiting branch offices and sales representatives with the title of director of the field force. Mr. Hammond has been with the company for 15 years. Other changes in personnel include the addition of three new members to the board of directors, Mr. Hammond, **R. A. Rascoe**, who is also controller and has been with the company for 24 years and **W. L. Badger**, a former professor of chemical engineering at the University of Michigan, who has been associated with the Swenson division of the Whiting Corp. for many years, having charge of all development and research activity pertaining to the process industries. **M. F. Becker**, vice-president and formerly field force director, has been promoted to co-manager of the equipment division.

• **Howard E. Emigh** has been appointed superintendent of the new aluminum alloy rolling mill at Lister, Ala., of the Reynolds Metals Co., Inc., Richmond, Va. Mr. Emigh for a number of years was connected with the Ford Motor Co. as a consultant and plant supervisor. Prior to that time he was engaged in engineering work for the Wheeling Steel Corp. and the Weirton Steel Co. Recently he was employed as consultant on rolling mill operations for the United Engineering & Foundry Co., Pittsburgh, and also served as general consultant for the Office of Production Management.

Commander Harry J. Heuster of Arlington, Va., has been selected to serve in the newly created post of special Reynolds representative to assist in the coordination of defense production for the aviation industry. He will devote his attention to technical aspects of aluminum production for aircraft needs.

Edwin J. Appel has been named manager of the new Longview, Wash., aluminum reduction plant of the Reynolds Metals Co., Inc. Mr. Appel has been production engineer for the company at Lister since last December. From 1919 to 1931, he was connected with the Aluminum Co. of America, serving in succession as technical supervisor of operation and assistant work superintendent in charge of one of their aluminum reduction



plants. Mr. Appel's other connections before going to Reynolds were with the International Latex Corp., Dover, Del., and the Taylor Instrument Companies, Rochester.

• **Harry I. Strube** has been appointed chief engineer of the Eastern division of the Link-Belt Co., Chicago, with headquarters at the company's Philadelphia plant, to succeed **F. F. (Ferd) Waechter**, who has resigned after rounding out 43 years of service. Mr. Strube has been assistant chief engineer at Philadelphia having begun his Link-Belt service in the engineering department of the company's

Pershing Road, Chicago, plant in 1910. Subsequently, he served as sales engineer, first at Chicago and then in Philadelphia. In 1924, he rose to the position of manager of vibrating screen sales, and in 1934, was made assistant chief engineer.

• **William W. Britton** has been made special representative for the Pacific Coast territory (including California, Oregon and Washington) of the Jessop Steel Co., Washington, Pa., with headquarters at Los Angeles. Mr. Britton has been a member of the Jessop sales staff for many years and before his transfer to the Coast, he represented the company in the Southern territory.

• **Allan Dysart**, chief inspector of Consolidated Aircraft Corp. from 1933 to 1935, has been appointed chief of the inspection department of the Republic Aviation Corp., Farmingdale, N. Y. Entering the aircraft industry in 1928 with the Curtiss Aeroplane & Motor Co., Garden City, N. Y., Mr. Dysart was transferred in 1931 to the Curtiss factory in Buffalo. Until joining Republic Aircraft in 1935, he headed the inspection department of Consolidated Aircraft when that company was in Buffalo.

• **Walter T. Norris** of Oakland, Cal., has been appointed district engineer for the Pacific Coast by the American Institute of Steel Construction, New York. Mr. Norris is a graduate of the University of Detroit and has been sales and designing engineer for the Moore Dry Dock Co. of Oakland.

• **Edward S. French**, president of the Boston & Maine and Maine Central railroads has been made board chairman of the Jones & Lamson Co., Springfield, Vt.

• **Alvan T. Simonds**, chairman of the Simonds Saw & Steel Co., Fitchburg, Mass., board of directors, has been made president and general manager. The last two offices were held by the late G. K. Simonds. G. K. Simonds, Jr., is assistant general manager.

• **James F. Paige**, outside manager at the Bethlehem Steel Co.'s Fore River works, Quincy, Mass., has been made superintendent of machine shops, Consolidated Steel Co., Orange, Tex.



S. H. HAMMOND, director of the field force of the Whiting Corp., Harvey, Ill.

• **Andrew Hutton**, heretofore vice-president and general manager of the Taylor Mfg. Corp., Milwaukee, has been appointed works manager of the Robins Conveying Belt Co.'s plant at Passaic, N. J. Mr. Hutton is in charge of all manufacturing operations, buildings and equipment.

• **Leon S. Howe**, general manager of Stanley Steel Strapping division of the Stanley Works, New Britain, Conn., has been elected vice-president recently. Mr. Howe is a former vice-president and general manager of the De Haven Mfg. Co., Brooklyn, and joined the Stanley Works 25 years ago to organize the steel strapping division.

• **J. K. Beeson** has been elected vice-president in charge of sales, Pittsburgh Steel Co., Pittsburgh. He formerly was assistant general manager of sales. Mr. Beeson has been employed by the company since 1930, both in the operating department, where he attained the position of assistant general superintendent, and in the sales department, where, through a series of promotions, he has risen to his present position. Mr. Beeson is the son of **Charles E. Beeson**, one of the founders of Pittsburgh Steel Co.

• **Percy Jenkins** has resumed all duties which he previously held as New England district sales manager, in charge of all products, for the Wickwire Spencer Steel Co., New York. He is located at the company's Worcester offices.

• **Forest S. Baster**, formerly chief engineer, has been elected vice-president in charge of engineering for White Motor Co., Cleveland. **Robert Cass**, formerly executive engineer, was named chief engineer and **O. F. Quartello**, who has been special design engineer, was named chief engineer of the company's White Horse division.

• **Howard N. Findley**, former Cleveland steel salesman, has been placed in charge of sales for a new division of the Avery Engineering Co., Cleveland.

• **Dr. R. W. Sorensen**, national president of the American Institute of Electrical Engineers, was the guest speaker before the Milwaukee section of the institute,

speaking on the subject, "Engineering Horizons, Limited."

• **Harry E. Orr**, for the past seven years chief metallurgist of the Burnside Steel Foundry Co., Chicago, has been appointed to the sales staff of the Vanadium Corp. of America, New York, in the capacity of sales engineer with headquarters at the corporation's Chicago office.

• **L. B. Keplinger** has been elected vice-president and director of the Rheem Mfg. Co., New York. He will continue his duties as assis-

tant to the president. In 1927, Mr. Keplinger resigned as executive vice-president of Peters Cartridge Co. to join Dillon, Read & Co. as industrial consultant. Leaving Dillon, Read in 1930, he engaged in private industrial consulting work on the Pacific Coast for 10 years until joining the Rheem organization in 1940.

• **Clifford V. Coons**, formerly manager of the Houston, Tex., plant of the Rheem Mfg. Co., has been appointed sales manager of the container division with headquarters in New York.

Obituary

• **Gustave R. Maertins, Sr.**, for many years a commanding figure in the automobile industry, died in Milton, Mass., March 28. He was born in Roxbury, Mass., 69 years ago. In 1901, in partnership with the Fisher brothers who later founded the Fisher Body Corp., he manufactured the first gasoline automobile.

• **Arthur Louis Freret**, chief electrical engineer of the Tennessee Coal, Iron & Railroad Co., Birmingham, died March 25 at his home in Birmingham. Mr. Freret, aged 64 years, had been chief electrical engineer of the company since 1932. He was past chairman of the Birmingham section of the Association of Iron and Steel Engineers. He was a native of France, a graduate of Tulane University and a Spanish-American War veteran.

• **L. N. Burns**, former vice-president of the J. I. Case Plow Works, predecessor to the J. I. Case Co., Racine, Wis., died March 26, aged 75 years. He was a former secretary of the Racine Association of Commerce.

• **K. F. Jacobsen**, founder of the Jacobsen Mfg. Co., Racine, Wis., died March 23 at his home there, aged 74 years. He was born in Denmark and came to Racine in 1890. In 1904 he opened a pattern shop under the name of K. F. Jacobsen & Co. which flourished because of the rapidly growing

automobile industry. He organized the Thor Machine Works in 1917; in 1921 production was concentrated on power lawn mowers and the name of the corporation changed to Jacobsen Mfg. Co. Because of ill health Mr. Jacobsen retired in 1937 but continued as a member of the board of directors.

• **Frank L. Kneisley**, aged 48 years, assistant superintendent of the shops division at Fairfield works, Tennessee Coal, Iron & Railroad Co., Birmingham, was killed March 23 in a traffic accident near Birmingham. A native of Springfield, Ohio, Mr. Kneisley went to the Birmingham district 20 years ago and had been employed by the Tennessee company since that time.

• **Frank Garrett**, secretary and general manager of Briggs & Turivas, iron and steel scrap brokers, Chicago, died on March 26. Mr. Garrett, who was 55 years old, had been associated with the firm for 25 years.

• **William J. Fleming**, formerly sales manager of the Bourne-Fuller Co., Cleveland, and then connected with the Republic Steel Corp., died March 26 at St. Luke's Hospital, Cleveland. He had been ill a week. Mr. Fleming who was born at Carlisle, Ohio, 73 years ago, had been with the concern 38 years when it became part of Republic.

• **Walter Thomas**, for 25 years production superintendent for Transue & Williams Steel Forging Corp., Alliance, Ohio, and later investigator for the Ohio Division of Aid for the Aged, died March 24 at Alliance, aged 63 years.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Apr. 1, 1941	Mar. 25, 1941	Mar. 4, 1941	Apr. 2, 1940		Apr. 1, 1941	Mar. 25, 1941	Mar. 4, 1941	Apr. 2, 1940
Flat Rolled Steel:									
(Cents Per Lb.)									
Hot rolled sheets	2.10	2.10	2.10	2.10					
Cold rolled sheets	3.05	3.05	3.05	3.05					
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50					
Hot rolled strip	2.10	2.10	2.10	2.10					
Cold rolled strip	2.80	2.80	2.80	2.80					
Plates	2.10	2.10	2.10	2.10					
Tin and Terne Plate:									
(Dollars Per Base Box)									
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00					
Manufacturing terne	4.30	4.30	4.30	4.30					
Bars and Shapes:									
(Cents Per Lb.)									
Merchant bars	2.15	2.15	2.15	2.15					
Cold finished bars	2.65	2.65	2.65	2.65					
Alloy bars	2.70	2.70	2.70	2.70					
Structural shapes	2.10	2.10	2.10	2.10					
Wire and Wire Products:									
(Cents Per Lb.)									
Plain wire	2.60	2.60	2.60	2.60					
Wire nails	2.55	2.55	2.55	2.55					
Rails:									
(Dollars Per Gross Ton)									
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00					
Light rails	40.00	40.00	40.00	40.00					
Semi-Finished Steel:									
(Dollars Per Gross Ton)									
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00					
Sheet bars	34.00	34.00	34.00	34.00					
Slabs	34.00	34.00	34.00	34.00					
Forging billets	40.00	40.00	40.00	40.00					
Wire Rods and Skelp:									
(Cents Per Lb.)									
Wire rods	2.00	2.00	2.00	2.00					
Skelp (grvd)	1.90	1.90	1.90	1.90					
Pig Iron:									
(Per Gross Ton)									
No. 2 fdry., Philadelphia	\$25.84	\$25.84	\$25.84	\$24.84					
No. 2, Valley furnace	24.00	24.00	24.00	23.00					
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06					
No. 2, Birmingham	20.38	20.38	19.38	19.38					
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00					
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34					
Basic, Valley furnace	23.50	23.50	23.50	22.50					
Malleable, Chicago†	24.00	24.00	24.00	23.00					
Malleable, Valley	24.00	24.00	24.00	23.00					
L. S. charcoal, Chicago	30.34	30.34	30.34	30.34					
Ferromanganese‡	120.00	120.00	120.00	100.00					
Scrap:									
(Per Gross Ton)									
Heavy melt'g steel, P'gh.	\$21.00	\$21.00	\$21.00	\$16.25					
Heavy melt'g steel, Phila.	20.00	20.00	20.00	16.75					
Heavy melt'g steel, Ch'go	19.75	20.00	19.50	15.25					
Carwheels, Chicago	20.25	20.25	20.25	16.75					
Carwheels, Philadelphia	23.00	23.00	23.00	20.25					
No. 1 cast, Pittsburgh	23.25	23.25	22.25	17.75					
No. 1 cast, Philadelphia	25.75	25.75	24.50	20.25					
No. 1 cast, Ch'go (net ton)	21.25	21.25	19.75	13.25					
Coke, Connellsville:									
(Per Net Ton at Oven)									
Furnace coke, prompt	\$5.625	\$5.625	\$5.50	\$4.00					
Foundry coke, prompt	6.25	6.25	5.75	5.25					
Non-Ferrous Metals:									
(Cents per Lb. to Large Buyers)									
Copper, electro., Conn.*	12.00	12.00	12.00	11.50					
Copper, Lake, New York	12.00	12.00	12.00	11.50					
Tin (Straits), New York	51.75	52.50	51.25	45.875					
Zinc, East St. Louis	7.25	7.25	7.25	5.75					
Lead, St. Louis	5.70	5.60	5.60	4.85					
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50					

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 119-128 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

FINISHED STEEL

April 1, 1941.....	2.261c. a Lb.....
One week ago.....	2.261c. a Lb.....
One month ago.....	2.261c. a Lb.....
One year ago.....	2.261c. a Lb.....

High	Low
1941.....	
1940.....	2.261c., Jan. 2 2.211c., Apr. 16
1939.....	2.286c., Jan. 3 2.236c., May 16
1938.....	2.512c., May 17 2.211c., Oct. 18
1937.....	2.512c., Mar. 9 2.249c., Jan. 4
1936.....	2.249c., Dec. 28 2.016c., Mar. 10
1935.....	2.062c., Oct. 1 2.056c., Jan. 8
1934.....	2.118c., Apr. 24 1.945c., Jan. 2
1933.....	1.953c., Oct. 3 1.792c., May 2
1932.....	1.915c., Sept. 6 1.870c., Mar. 15
1931.....	1.981c., Jan. 13 1.883c., Dec. 29
1930.....	2.192c., Jan. 7 1.962c., Dec. 9
1929.....	2.236c., May 28 2.192c., Oct. 29

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

PIG IRON

\$23.61, Mar. 20	\$23.45, Jan. 2
23.45, Dec. 23	22.61, Jan. 2
22.61, Sept. 19	20.61, Sept. 12
23.25, June 21	19.61, July 6
23.25, Mar. 9	20.25, Feb. 16
19.74, Nov. 24	18.73, Aug. 11
18.84, Nov. 5	17.83, May 14
17.90, May 1	16.90, Jan. 27
16.90, Dec. 5	13.56, Jan. 3
14.81, Jan. 5	13.56, Dec. 6
15.90, Jan. 6	14.79, Dec. 15
18.21, Jan. 7	15.90, Dec. 16
18.71, May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL

\$22.00, Jan. 7	\$20.00, Feb. 11
21.83, Dec. 30	16.04, Apr. 9
22.50, Oct. 3	14.08, May 16
15.00, Nov. 22	11.00, June 7
21.92, Mar. 30	12.92, Nov. 10
17.75, Dec. 21	12.67, June 9
13.42, Dec. 10	10.33, Apr. 29
13.00, Mar. 13	9.50, Sept. 25
12.25, Aug. 8	6.75, Jan. 3
8.50, Jan. 12	6.43, July 5
11.33, Jan. 6	8.50, Dec. 29
15.00, Feb. 18	11.25, Dec. 9
17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

A SLIGHT measure of relief in the intense pressure on steel mills has come about through the suspension of orders by the British for all carbon steels (alloys not being affected) for two months, or "until further notice." As other orders on mill books will replace the British tonnage, there will be no change of pace in steel production, but some consumers may obtain shipments a little sooner than they expected.

From official sources, it is learned that the reasons for the British action are several. British steel production and supplies of steel in Britain are in excess of anticipations, while on this side about 400,000 tons of semi-finished and finished steel and an additional tonnage of pig iron and scrap are at docks awaiting shipment. In view of this situation, it was considered desirable to conserve shipping space for other supplies that are more urgently needed.

It was also considered desirable to relieve pressure on American mills, since some of the steel on order was not likely to have been shipped for some months, and thus clear the way for any urgent requirements that might develop.

Some of the orders that have been suspended may eventually be cancelled outright and if and when they are reinstated they will come under the general procurement program of the Lease-Lend Act.

Exports of steel to Great Britain have been declining in recent months. They were hardly more than 350,000 tons in January, fell to about 300,000 tons in February and probably were less than that in March.

SO far as production statistics go, however, the British action will not be discernible. This week the industry is again operating at an average of 100 per cent. While there have been losses in some districts, notably at Cleveland and Buffalo, chiefly due to shutdowns for repairs, there have been offsetting gains in other districts. The Southern Ohio district is up five points to 112 per cent, Pittsburgh is up one point to 102 per cent, Chicago has gained a half point to 101½ per cent and the Youngstown district is up a point to 101 per cent. The two-day strike at Bethlehem, Pa., last week affected some mill operations, but no ingot production was lost.

AS THE IRON AGE goes to press the question of whether there will be a strike of bituminous coal miners was still in doubt despite the intervention of President Roosevelt. Should there be work stoppage at the mines, the iron and steel industry would not be immediately affected because of coal and coke stocks on hand. Some tight spots might develop within a week, however, at certain beehive coke ovens which are serving merchant blast furnaces. The March 1

- British suspend all carbon steel orders in the United States . . . Have 400,000 tons on docks . . . Industry, still under heavy pressure, operating at 100 per cent again this week . . . Scrap differentials out this week . . . TNEC would abolish basing point system.

report of the U. S. Department of the Interior showed 43 days' average supply at by-product coke ovens, 30 days' at steel mills, while for all industrial users the average was 38 days.

March steel business was heavier than that of February, creating April 1 backlogs larger than those of a month ago. The buying pace may slow up somewhat, however, because some mills are declining to book orders for 1942 and can take little or no additional business in some products for this year. On sheets in particular some mills are out of the market for all of 1941. Because of the congested situation, some steel companies are working out a reclassification of steel orders, listing direct defense orders, British orders and orders from all other sources in such a way that more stringent control may be exercised. Strict priority control over nickel alloy steels is in the offing. They are at present on the critical list and subject to allocation. Tungsten has been placed under the priority system. The settlement of the long strike at an important Vanadium plant may have averted a critical shortage of this metal.

ASIDE from defense business, which is taking an increasing proportion of steel output, the outstanding demand is from the automobile industry, which is taking all the materials it can get and running at top speed in anticipation of possible curtailment later on. Shipbuilding work will be increased by an expected award of 72 tankers, requiring about 300,000 tons of steel, to an eastern shipyard. Railroad activity includes the prospective purchase of 2400 cars by the Illinois Central. Fabricated structural steel awards have spurted to 47,000 tons, with nearly 32,000 tons pending. Reinforcing bar awards are 15,000 tons, with 22,700 tons pending.

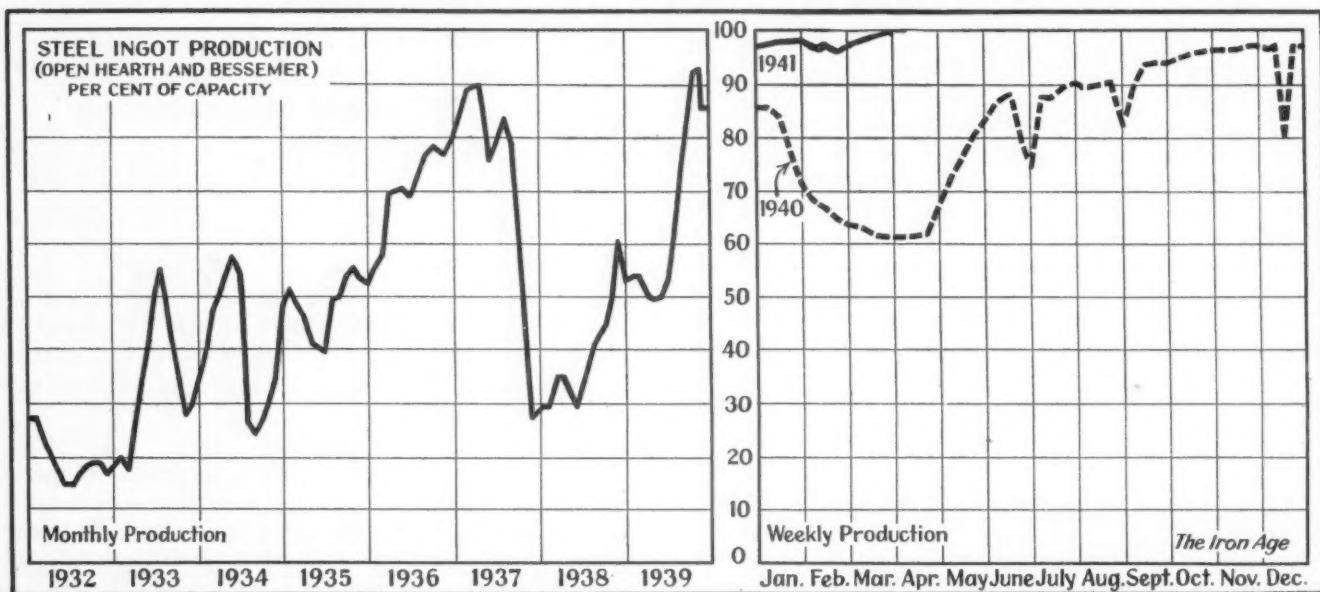
Government prices on iron and steel scrap, which will be announced this week, will follow the pattern of the controls over prices of aluminum and zinc scrap. THE IRON AGE scrap composite price has declined slightly to \$20.25.

The Industrial Pace . . .

BOLSTERED BY GAINS in steel ingot production and heavy construction activity, THE IRON AGE index of capital goods activity rose 0.2 points in the past week, halting the gradual decline evident recently. Three components gained, offsetting losses in two others. Raw steel production touched 100 per cent of capacity, on a tonnage basis a new record for the industry. Automobile output advanced less than seasonally, assemblies totaling 124,165, as against 123,805 (revised) two weeks ago. The lumber carloadings series declined 1.5 points, while activity at Pittsburgh was up slightly.

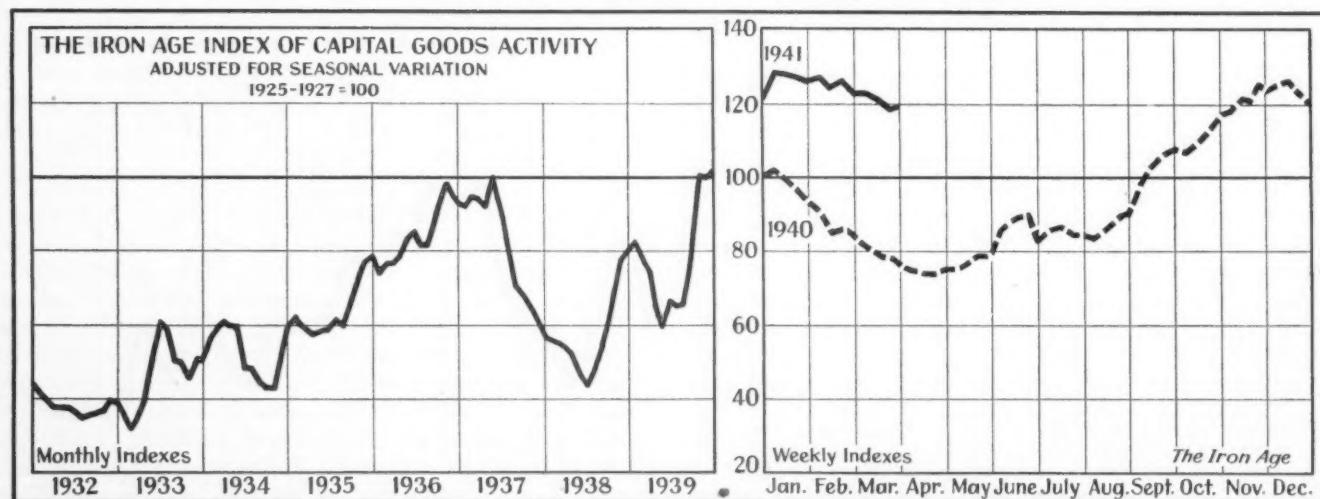
INFLUENCED BY A SLACKENING in the initial spurt of structural buying for plant expansion, new orders for fabricated steel in February, 159,815 tons, were 40 per cent under the January volume of 266,594, although they were 61 per cent heavier than February, 1940. New orders received by manufacturers in February showed further gains, the index rising 5 per cent above January, and 100 per cent above February, 1940. Inventories increased moderately in February, the index standing at 131.6, as compared with 129.3 in January, and 114.9 in February, 1940.

Operations Continue at 100%



District Ingot Production, Per Cent of Capacity	The Iron Age													
	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern River	S. Ohio	Western	St. Louis	Eastern	Aggregate
Current Week ..	102.0	101.5	101.0	96.0	97.0	100.5	85.0	96.0	95.0	112.0	102.5	111.0	95.5	100.0
Previous Week ..	101.0	101.0	100.0	96.0	101.0	106.0	85.0	100.0	95.0	107.0	102.5	111.0	101.5	100.0

Four Weeks' Decline In Index Checked

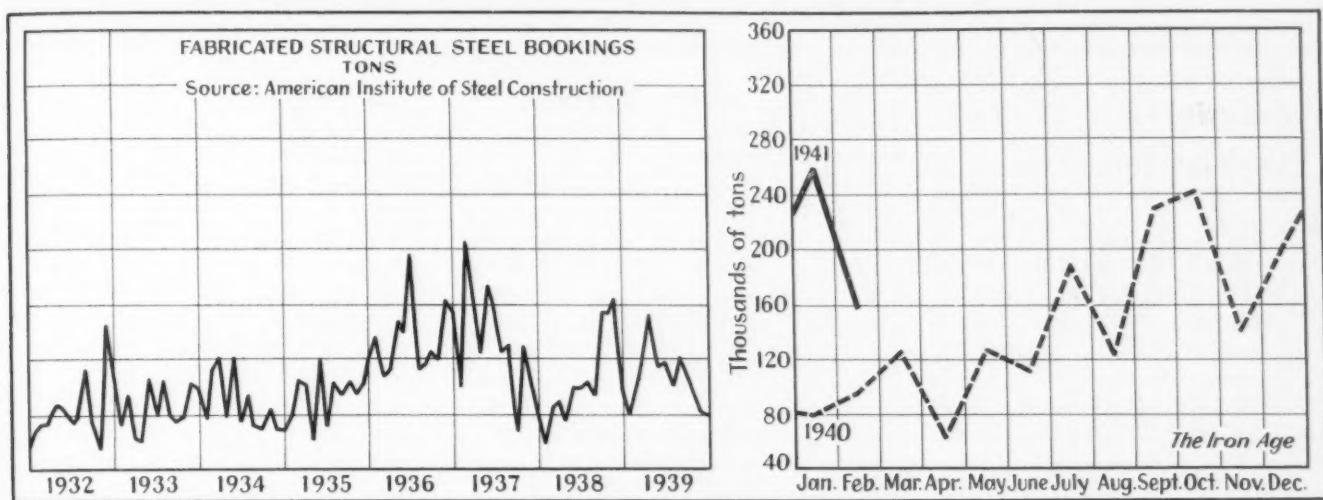


▼ Component	Week Ended	Mar. 29	Mar. 22	Mar. 1	Mar. 30	Mar. 30
Steel ingot production ¹	132.8	130.8	130.1	78.3	121.3
Automobile production ²	110.2	114.0*	130.3	91.7	126.8
Construction contracts ³	154.9	151.3	160.0	71.0	142.9
Forest products carloadings ⁴	70.4	71.9	70.9	60.4	126.3
Pittsburgh output and shipments ⁵	126.9	126.2	124.7	87.9	117.4
COMBINED INDEX	119.0	118.8*	123.2	77.9	126.9

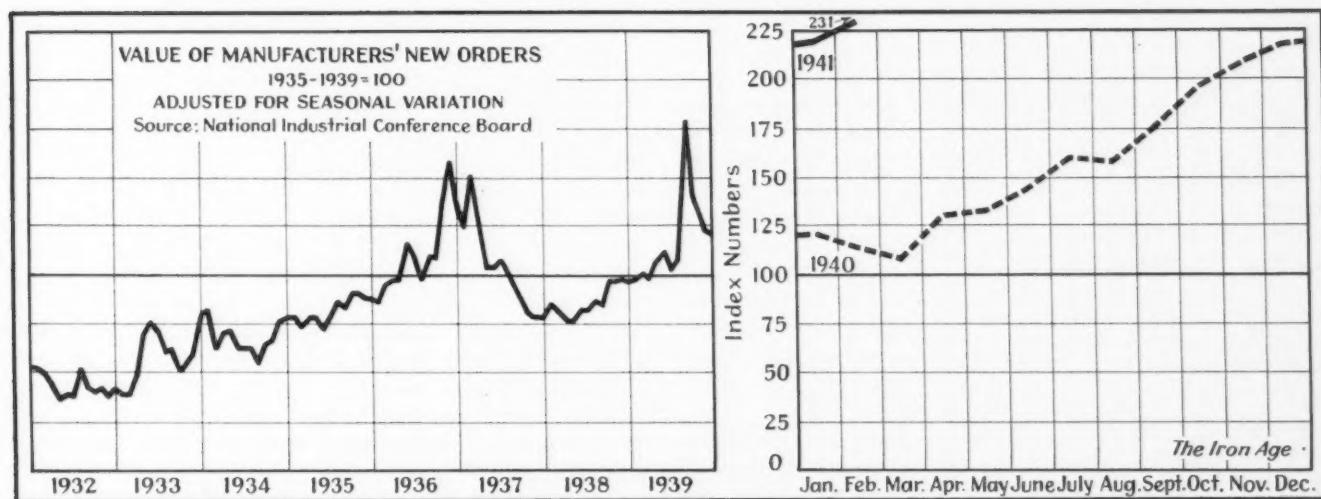
* Revised

Sources: ¹ THE IRON AGE; ² Wards Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended March 22. Other indexes cover week of March 29.

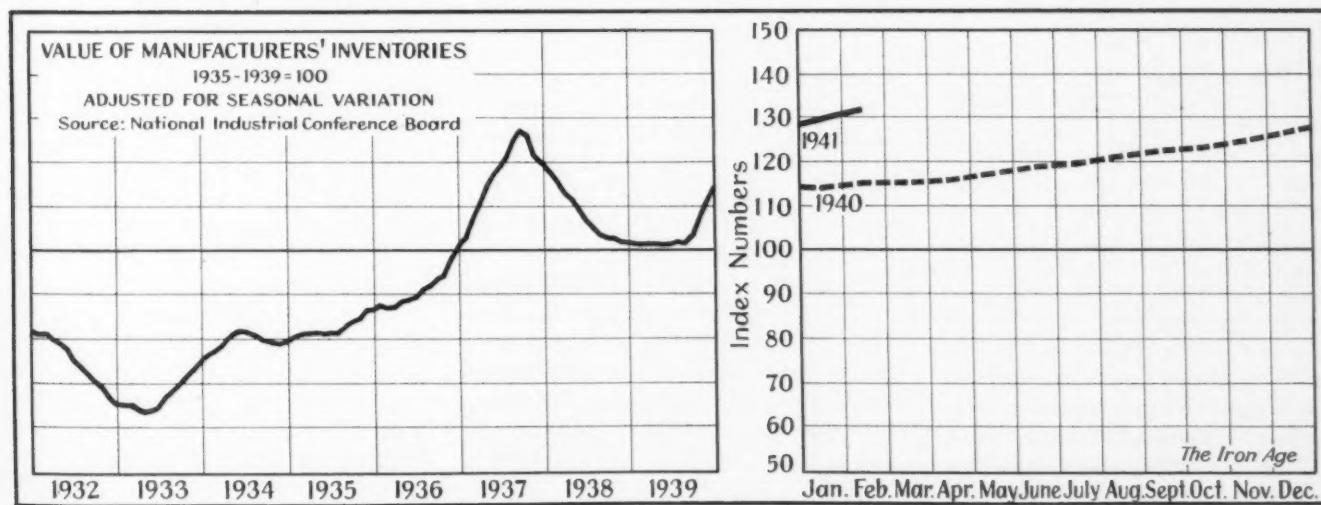
Fabricated Steel Orders Reflect Tapered Defense Building



Expanding Manufacturers' Orders Double February, 1940



Inventory Accumulation Gradual But Steady



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

...British ask American mills to suspend production of carbon steels

The British Iron & Steel Corp., the affiliate of the British Purchasing Commission which has charge of purchases in the United States of steel, pig iron and scrap, has asked American mills to suspend production and shipments of all carbon steel products on which work is not in process. The suspension is for two months or "until further notice." No alloy steels, only carbon products, are affected by this action. From official sources it is learned that the reasons for the British action are as follows:

British steel production and supplies of steel in Great Britain are in excess of anticipations. In view of this situation and the fact that about 400,000 tons of semi-finished and finished steel of American manufacture are at docks on the Atlantic Coast awaiting shipment to Britain, it was believed to be desirable to conserve shipping space, of which there is an acknowledged shortage, for transportation of other materials more urgently needed at the moment. Also, from the viewpoint of joint British and American interests, it was believed desirable to relieve the pressure on steel mills here, especially with regard to material which was not to be delivered for two or three months or longer so that rolling space would be made available for any urgent requirements that might develop. Mills have been given the option of completing orders where processing has proceeded far enough to make such a course desirable from the mill standpoint. Orders on which no work has been done may eventually be cancelled and, if and when they are reinstated, they probably will become a part of the general procurement program of the United States under the provisions of the Lease-Lend Act. Another factor in the situation is the desire of the British to conserve whatever dollar exchange they have available for the liquidation of other commitments in the United States.

During January shipments of steel to Great Britain were not more than 350,000 tons, while in February they probably fell to about 300,000 tons, with a still lower figure for March indicated. These shipments are in contrast to movements last July and August when close to 600,000 tons each month was shipped.

Steel mills are expected to get little respite from this change in British orders since all available rolling mill schedules which had been set up for British supplies will obviously be immediately utilized for American defense and other purposes. However, the situation for some consumers may be eased temporarily in that some shipments may be made sooner than would otherwise have been possible.

Although steel shipments to automotive centers have reached an all-time high, the automobile industry is exerting pressure for deliveries in order to maintain the unusual assembly schedules now in existence. According to PITTSBURGH reports, steel supplies in the hands of automobile makers are not completely balanced with specific car requirements. That is, production in some cases is being hampered by lack of various parts, even though other steel supplies are greater than production requirements. Aside from pressure for delivery on commitments now on the books, the automotive industry continues to order heavily for 1942 model cars. The only explanation for this breakneck pace in addition to heavy consumer demand is the belief that car makers expect production of 1942 models to be interfered with subsequently by national defense requirements.

With all consumers ordering heavily, backlogs at PITTSBURGH have increased, deliveries are further extended, and March buying on a daily basis will reach an all-time record. Steel buyers are going to great lengths in getting material, an extreme case recently being the shipment of a carload of galvanized sheets from the Pittsburgh-Youngstown district on an all-rail rate to the Pacific Coast.

Despite record production in March, order backlogs held by CLEVELAND and YOUNGSTOWN steel producers are much higher at the start of April. Forward buying continues just as brisk as ever. As time goes on much of the accumulated tonnage faces the prospect of reclassification due to the industry's determination to distribute output fairly.

Although some mills reported a slight decline in orders during the past week, CHICAGO producers found March business a record-breaker. Over 100 per cent production for three consecutive weeks indicates the speed at which steel is being turned out.

The percentage of defense tonnage is mounting steadily each week there, with the automotive interests about the only principal non-defense buyers of important size. Alloy orders are increasing, much going to auto purchasers. However, a decline in buying from that source is seen. About the only steel users not active there are oil equipment and steel culvert manufacturers.

A producer at BIRMINGHAM during March received orders for tonnages double the total booked in February. While this 100 per cent increase, resulting in part from several defense orders placed with this particular company, probably exceeds gain in bookings for that district as a whole by a substantial margin, it does reflect the extremely heavy influx of orders there.

Some tonnages are being accepted by EASTERN PENNSYLVANIA producers for shipment in first quarter of 1942, but only from customers with well-defined requirements such as shipyards. Occasional small tonnages of plates and sheets can be squeezed into schedules, one small galvanized sheet order being taken care of in this way for third quarter shipment.

The Navy Department has placed orders aggregating 97,157 tons for semi-annual steel requirements. Distribution of the tonnage follows: Worth Steel Co., 31,363 tons of black and galvanized plates and sheets; Lukens Steel Co., 30,203 tons of black and galvanized plates;

M A R K E T N E W S

Bethlehem Steel Co., 15,818 tons of black and galvanized bars and angles; Carnegie-Illinois Steel Corp., 14,036 tons black and galvanized special eye beams, strips and angles, and Alan Wood Steel Co., 5737 tons of black and galvanized sheets. An award also was given the Jones & Laughlin Steel Corp. for 534 tons of J. & L. Jr. beams.

Prices

... Second quarter announcement will await wage determination.

No formal announcement of second quarter prices is now expected before termination of the wage negotiations between the SWOC and Carnegie-Illinois. Steel consumers have been given assurance that "until further notice" material will be billed at the prices prevailing in the first quarter.

Steel Operations

... With gains at Pittsburgh and Chicago, rate remains at 100 per cent.

With production gains in four districts offsetting losses elsewhere, the ingot production rate for the current week is estimated at 100 per cent, unchanged from last week. The PITTSBURGH rate gained a point to 102 per cent and the CHICAGO rate went up half a point to 101½ per cent. The YOUNGSTOWN district rate gained a point to 101 per cent, and the SOUTHERN OHIO rate made the sharpest gain of all, five points, to 112 per cent.

There were sharp losses, however, at BUFFALO and CLEVELAND, caused by shutdowns for repairs. The CLEVELAND-LORAIN average is down four points to 97 per cent and the BUFFALO loss is five and a half points to 100½ per cent. There was also a loss at DETROIT of four points to 96 per cent, while the EASTERN district, where capacity is relatively small, is down six points to 95½ per cent. One furnace taken off at BUFFALO for repairs will be back in service by Friday of this week.

A new all-time record of monthly steel production by Bethlehem Steel Co. plants was made in March, 1941, with a total output of 1,024,

026 tons. The previous high was in January, 1941, when production was 1,017,346 tons. The Bethlehem plant set a new record, with March production higher than any prior month by 7,000 tons. The operating rate of the company for March was 101.2 per cent of rated capacity.

Pig Iron

... Supply situation is tight but not critical

Cleveland reports the pig iron situation continues tight but not critical for regular customers of merchant sellers, even though their requirements are much higher. Attempts to purchase for third quarter are being discouraged.

Merchant pig iron producers at BUFFALO report they are selling "conservatively" but that there is already a considerable accumulation of orders on the books for second quarter delivery. The demand is strong and all customers apparently well satisfied. A large steel mill there is practically out of the pig iron business owing to its own need for the supply from its blast furnaces. Reports from foundries indicate brisk activity with melting operations on a five, and more often six-day week basis.

Some EASTERN PENNSYLVANIA sellers continue to book orders from regular customers at prices at time of shipment, while others are still holding off. Supplies are tight, however, and many consumers find that tonnages allotted to them, based on 1940 requirements, afford no opportunity to build reserves, and are continually pressing for heavier commitments. Some sort of subsidy would be required, it is felt, to turn back into production two long-idle, high-cost furnaces in the district, one owned by the Colonial Furnace Co. at Riddlesburg, Pa., and the other by the Delaware River Steel Co. at Chester, Pa.

Virtually all consumers in SOUTHERN OHIO have placed orders for second quarter. Ordering for the most part was on the same basis as first quarter. The Hamilton Coke & Iron Co. is still out of the market, so far as production of merchant iron is concerned, although it is covering regular customers. A number of foundries in that district are

operating full six days, but five is the general average.

Shipments to melters in the ST. LOUIS area continue at a high rate, with makers now endeavoring to regulate the movement so as to satisfy all regular customers. Most of the makers are sold up for second quarter.

In NEW ENGLAND buying for the second quarter continues in good volume with about a third of the foundry industry fully covered. The tempo of foundry activity is a little faster. More are working at least some night shifts.

At YOUNGSTOWN No. 3 blast furnace of Republic Steel Corp. produced 1495 tons of iron on March 26, exceeding its previous record established Feb. 18. The furnace was blown in in October, 1938, and has a rated daily capacity of 1000 tons.

Carnegie-Illinois Steel Corp. blew in a blast furnace on Monday at its Ohio Works, Youngstown.

Semi-Finished Steel

... British holdup will give temporary respite

The respite which steel makers may have because of a holdup "until further notice" on British production and purchases may be short-lived owing to heavy commercial and American defense demand.

CLEVELAND reports forge shop requirements, already many times above normal, are still mounting. Strictest scrutiny is given on new inquiries. In one or two instances seemingly large inventories at consuming shops have been uncovered.

Iron Ore

... First boats leave for upper Lake ports

Vessels of the Great Lakes fleet were leaving lower Lake ports early this week to pick up their first cargoes of Lake Superior ore, which are badly needed to replenish low stock piles. In the Northern mining districts operations are in full swing. Shipments of all interests will be exceptionally heavy this year. Some mines closed since 1937 are scheduled to resume operations.

Reinforcing Steel

... Awards nearly 15,000 tons, new jobs 22,700 tons.

Reinforcing steel awards of 14,960 tons include 5000 tons for the Fort Green housing project in Brooklyn; 2000 tons at Morgantown, W. Va., for an ammonia plant for E. I. du Pont de Nemours & Co.; 2000 tons for a navy dry dock at Philadelphia, and 1067 tons for the Bureau of Reclamation at Tucumcari, N. M.

New reinforcing steel projects total 22,700 tons. The largest inquiries include 6000 tons at Fort Wingate, N. M., for an ammunition depot; 5125 tons at Pointe Coupee Parish, La., for a bridge for the New Orleans, Texas & Mexico Railway Co.; 4000 tons for an assembly plant for the Glenn L. Martin Co. at Omaha, Neb.; 1500 tons at East Chicago, Ind., for a refinery for the Socony-Vacuum Oil Co., and 1500 tons at Gravelly Point, Md., for five hangars.

Warehouse Business

... Stocks moving out faster than shipments come in

Pittsburgh warehouses were called upon to a greater degree during March in order to fill requirements of consumers unable to obtain supplies at mills. Total sales were somewhat ahead of February volume and it is claimed in some quarters that many warehouses are moving material out much faster than stock piles are being replenished. Many long distance deals are involved in warehouse sales with customers sparing no expense to obtain needed specific sizes or products.

At CLEVELAND March order volume set a new record and the month may not be exceeded again this year. Operators report that large inquiries ranging up to 400 tons apiece are numerous. Tight situations are prevalent in certain grades of alloy steel, such as 2300 and 3100 series, stainless steel and special sheets requiring processing. CLEVELAND warehouses report their average rate lower due to rising costs.

Cooperation among jobbers in the PHILADELPHIA district is aiding materially in filling orders and

keeping customers satisfied. In general, stocks are in pretty fair condition, although some sizes of plates and sheets are practically unobtainable. March business was just about on a par with that of February.

BUFFALO warehouses report March business was "the best of any month in history" and prospects are that April will bring no letup. Sales have been especially heavy in alloy and cold finished bars, cold finished sheets and heavy plates.

CHICAGO warehouses again broke records in March, some chalking up 15 per cent gains over February, which was a record-breaker itself. Stocks have been diminishing and some houses find their stocks unbalanced as a result. Structural shapes are particularly hard to get.

Shipbuilding

... Sun plant may get contracts for 72 tankers

The Maritime Commission is expected shortly to award 72 tankers to the Sun Shipbuilding Corp. at Chester, Pa. Auxiliary naval vessels the shipyard had previously contracted to build will be transferred elsewhere.

Expansion of shipbuilding facilities for the Navy Department is provided for under contracts aggregating \$1,278,800 made with three companies. The companies and the costs of expansion are the Tampa Shipbuilding, Tampa, Fla., \$238,800; the American Basch Co., Providence, R. I., \$825,000 and Busch-Sulzer Bros., St. Louis. The contracts call for building of additional facilities and installation of tools and equipment at the plants of the companies.

The Pittsburgh Steamship Co., U. S. Steel subsidiary, will build three 17,500-ton ore freighters to augment its Great Lakes fleet.

Plates

... 72 tankers will take nearly 300,000 tons of steel

It is understood the allocation of 520,000 tons of steel, most of which is plates, needed for the 200 "ugly ducklings," was made to steel companies on the relative

basis of plate capacities. In many instances substantial tonnages were allocated to steel companies with high speed strip mills which either have been making plates of certain sizes or can arrange their schedules to do so.

Railroad Buying

... Illinois Central inquiring for 2400 freight cars

Orders for 1155 freight cars and nine locomotives have been placed in the past week.

Illinois Central is in the market for 1000 60-ton hoppers, 1000 40-ton wood-lined box cars, 100 hoppers of 70-ton capacity, 100 flat cars and 200 refrigerator cars.

Reading Co., Philadelphia, will build 500 drop-end gondola cars in addition to 1100 freight cars which were reported in THE IRON AGE of March 6 to be under construction for the Central of New Jersey. The board of directors authorized the building of 10 diesel-electric switching locomotives ranging from 600 to 1000 hp. An order for 200 tons of rails was placed with Bethlehem.

Nickel Plate has ordered 500 all steel box cars of 50-ton capacity from American Car & Foundry Co. at a cost of about \$1,400,000.

Pennsylvania will build 50 container cars of 90-ton capacity in its shops.

Minneapolis & St. Louis is buying 50 50-ton steel box cars from Pullman-Standard Car Mfg. Co.

Baltimore & Ohio is reported to have placed an additional 50 cement cars with the Greenville Steel Car Co.

Delaware & Hudson is constructing in company's shops five 100-ton well cars.

The Russian government is inquiring for 100 steel air-dump cars of 70-ton capacity.

St. Louis Terminal Railroad Association has ordered a total of eight 1000 hp. diesel-electric switchers, placing three with American Locomotive Co., two with Baldwin Locomotive Works and three with Electro-Motive Corp.

The Standard Fruit & Steamship Co. is buying one 2-8-0 locomotive from American Locomotive Co. for Honduras.

Structural Steel

... Awards of 47,100 largest since January.

Fabricated structural steel awards of 47,100 tons are the highest since the last week in January. Outstanding lettings are 10,300 tons for government warehouses at Atlanta, Ga.; 6000 tons for a munitions plant at St. Louis; 3000 tons for shipways at Chester, Pa., for the Sun Shipbuilding Corp.; 2800 tons for a Navy assembly plant at Long Beach, Cal.; 2000 tons at Longview, Wash., for a plant for the Reynolds Metals Co.; and 2000 tons at Philadelphia for a press shop for the Midvale Co.

New structural steel projects of 31,725 tons are slightly lower than a week ago. Sizable new inquiries include 4700 tons at Wireton, Pa., for the Frank R. Phillips station of the Duquesne Light Co.; 4500 tons at Bayonne, N. J., for dry dock trusses for the Navy department; 4000 tons for the superstructure of the Chicago River bridge at Chicago; 2500 tons for a highway bridge in Allegheny County, Pa.; 1800 tons for a building in Providence, R. I., for the New England Telephone & Telegraph Co.; 1700 tons for a diesel engine building at Coatesville, Pa., for Luken-Weld, Inc.; 1600 tons at Wood River, Ill., for a power plant for the Standard Oil Co. of Indiana, and 1400 tons in New York for the East River Drive viaduct between East 45th and East 50th Streets.

Merchant Bars

... Orders and production are at unprecedented level.

Automotive, national defense and miscellaneous demand forced the level of bar sales in March to an all-time high at PITTSBURGH. Pressure for shipments of orders already booked is exceptionally heavy, especially from automotive centers. PITTSBURGH reports all lines of consumption are ordering far ahead of actual needs in order to maintain a steady flow of incoming material.

Orders seem to be endless at YOUNGSTOWN and CLEVELAND, where March output rose to unprecedented proportions. In most mills rolling schedules are being revised frequently in order to fit in emer-

gency tonnages and serve consumers as equitably as possible.

The percentage of strictly defense business in bars at CHICAGO is estimated at 60 to 80 per cent and growing steadily. Alloy specifications show no letup. Automotive purchases have taken considerable alloy tonnage in the past three weeks. Shell steel orders pursue a steady course—one mill getting 500 tons last week—while several of the big shell contractors have still not ordered. As reported in THE IRON AGE a few weeks ago, large orders for shells, shell forgings, bombs, bomb fins, fuses, cartridge cases, boosters, etc., were finally placed in that area this week, which will involve steel in the thousands of tons.

Bolts, Nuts and Rivets

... Makers of nuts and screws study rising costs.

Rising costs of certain types of semi-finished nuts and machine screws are the subject of study by several of the leading bolt and nut producers. All makers have experienced higher labor costs arising principally through heavy overtime payments. One or two of the principal cap screw manufacturers are inclined toward the viewpoint that less freight absorption may be necessary, that cash discounts may be revised and other steps to tighten up may be necessary. Orders at some plants during the past week again exceeded production. A few analyses of raw material are becoming increasingly difficult to obtain. In certain cases customers have found it advisable to revise their specifications in order to obtain quicker delivery.

Sheets and Strip

... Some mills out of market on sheets

Although the effect will not be immediately noticeable, the allocation of plates for the 200 "ugly ducklings," which was completed last week, will, in some measure, influence deliveries of sheets. This condition is more apt to occur at steel companies where high speed strip mill capacity is being earmarked for some ship plate production. If and when the 300 additional merchant ships are placed, the effect on sheet production will be more pronounced.

Customers' insistence upon convenient sizes is beginning to fade at CLEVELAND and YOUNGSTOWN, where production facilities are jammed and shipping promises often very indefinite. By taking wider sizes, even using sheets instead of strip, the buyer often can obtain quicker deliveries, particularly in cold strip and silicon strip. In both the Ohio districts large new tonnages for definite purposes are coming out frequently.

Tin Plate

... Purchases, both domestic and export, have increased

Domestic and export tin plate purchases have expanded somewhat in the past few weeks. Requirements from Australia, Canada and South America are somewhat heavier than a few months ago. High speed cold reduction tin plate mills are estimated to be running at 98 per cent of capacity, up one point from a week ago.

Wire Products

... Orders running ahead of shipments

Pittsburgh reports total wire sales to be running ahead of actual production or shipments. Manufacturers' wire demand is exceptionally heavy owing to unusual automotive demand. Merchant product requirements are expanding seasonally.

Tubular Goods

... 16,000 tons of 18-in. pipe sold for naval project.

Youngstown Sheet & Tube Co. and American Rolling Mill Co. shared about 120 mi. of 18 in. steel pipe for a Key West, Fla., naval project, total steel requirements approximating 16,000 tons.

Coke

... Birmingham producer relighting long-idle ovens

The Plateau Coal & Coke Co., Birmingham, is rehabilitating and lighting 50 beehive coke ovens out of 150 ovens, inactive more than 20 years, which the company recently purchased from Yolande Coal & Coke Co., Birmingham.

Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Much Business To Come

Cincinnati

• • • Machine tool bookings in this district are up just a trifle from the past few weeks, level. Machine tool manufacturers report that there is still a considerable amount of U. S. and British business yet to be placed and they anticipate a substantial portion of this will come into the market at any time. There is a heavy flow of demand for tools to be used in producing military equipment, such as shells, guns and similar types of equipment.

Some delay in plant expansion has been reported over inability of builders to obtain structural steel. In fact, in one instance the foundation of a plant is now ready and waiting for the erection of the steel frame work, but is de-

layed over inability to get shipment on structural steel needed. The labor situation with regard to the availability of workmen has eased somewhat, since learner and apprentice programs have produced sufficient men to accommodate at least the most pressing needs. Of course, there is still room for further good men, since a number of the plants could expand their night forces to run full capacity, 24 hr. a day.

Several New Projects Active

Cleveland

• • • One of the newer projects of interest in this vicinity centers at Akron, where the Steel Products division of Firestone has been purchasing equipment for a large direct defense contract on which it holds a fair priority rating. Ap-

parently much subcontracting and shell making has arisen in connection with the Firestone job.

At Columbus the Timken Roller Bearing Co. has announced the appropriation of \$274,000 for installation of additional facilities for the manufacture of precision machine tool bearings. At Toledo it is reported Willys-Overland has received approval to embark on the forging of aluminum. The company is reported to have ordered about 20 hammers and will require other equipment.

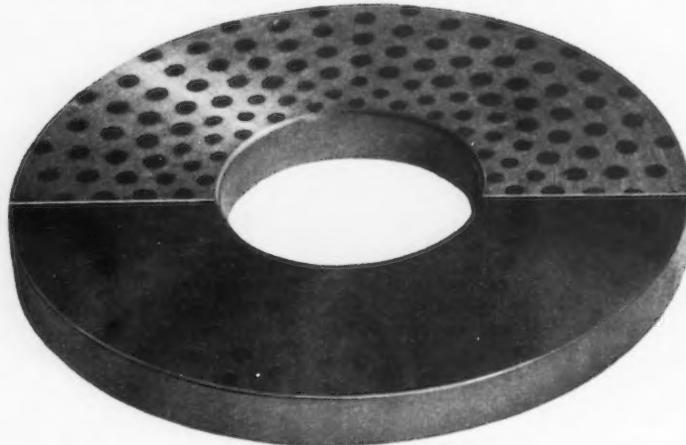
Instances have been uncovered recently where new tools have been taken from certain plants and sent to other locations where more vital contracts are held. Deliveries on all types of machine tools seem to be lengthening constantly. The gage situation continues to be critically tight. Some authorities assert the full extent of the shortage is not being recognized. Another angle which some observers believe might cause trouble ultimately is the fact that tool room requirements in many new plants do not seem commensurate with the size of the projects.

Dealer Backlogs Still Climb

New York

• • • Although no marked increase in demand has appeared in this market as a result of the wider rearming program initiated by passage of the Lease-Lend bill, scattered demands from defense contractors are still in excess of current shipments of machine tools. Despite the fact that shipments and billings have been rising steadily from month to month, one of the leading dealers reports that dollar volume of new orders booked in March was approximately double the value of corresponding shipments. March has been the best month this year for several dealers, although the volume of orders does not compare with some months last fall when the Wright Aeronautical Corp. was buying \$22,000,000 worth of machine tools for its Lockland, Ohio, plant.

How METALINE Works



Examine a METALINE Oilless Bronze Bearing after it has been in service a short time and the lower half of the illustration above suggests what you will see.

The surface over bearing and shaft will have acquired a blue-black finish, produced by the METALINE lubricant, smooth as glass, eliminating friction between bearing and shaft.

The METALINE plugs in the bearing constitute a reservoir of lubricant adequate for long normal service without replenishing. Wear is kept at a minimum.

This effective method of clean, oilless lubrication has thousands of applications. Investigate METALINE OILLESS BRONZE BEARINGS for use in your plant and products wherever there are moving parts.

R.W. RHOADES METALINE CO. Inc., Long Island City, N.Y.

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York

••• Maximum prices for scrap and secondary slab zinc were finally fixed by the government this week in a move long awaited by the metals industries. Prices applied to the recognized grades and their customary basing points. The move was similar to that made recently with regard to scrap and secondary aluminum. Brass ingot makers will confer with the government on prices within the week. In the regular non-ferrous markets, an advance in the price of lead attracted most interest in the past week. Tin prices fell off sharply, while the copper and primary zinc markets proceeded along routine lines.

Rumors of an additional purchase of 100,000 tons of copper by the Metals Reserve Co. remained unconfirmed at the beginning of the week, although it was felt that such a purchase in the future would not be entirely improbable. In the meantime allocations of tonnage by the mine producers continued in good volume at 12c. a lb., delivered Connecticut Valley. Custom smelters reported fair inquiry at 12.50c. for nearby and May delivery. The export market largely nominal.

Lead

Leading producers raised their price \$2 a ton on Wednesday of last week to the basis of 5.85c. a lb., delivered New York, after several weeks of heavy buying in an active market. The upward revision failed to discourage consumers, however, and inquiries for additional tonnages appeared at a rate which showed scarcely any slackening from the previous week. Matching intake quotas from day to day without any difficulty, sellers estimated that April requirements are already 90 per cent filled and that 30 per cent of May needs have been accounted for. The price advance, it is felt, will be of some influence in encouraging a heavier flow of foreign lead to this country shortly.

Zinc

While maximum prices were announced and steps were being

taken to put them into effect in the scrap and secondary zinc market, activity in the regular market remained free of any unusual developments. Sellers continued to do the best they could with what zinc they had available but supplies are still far from the volume of demand. Prime Western was unchanged at 7.64c. a lb., delivered New York. Consumer stocks of slab zinc at the end of February were down 5 per cent and total stocks were off to 67,289 tons, as compared with 70,640 tons at the end of January, according to a recent statement by the Bureau of Mines.

Tin

The market declined rather sharply here late last week when

very heavy selling in the Far East led to substantial price reductions there. The large volume of foreign transactions was believed to have resulted from the political implications of the major naval battle between the British and Italians. Tin deliveries to this country in March exceeded 16,000 tons.

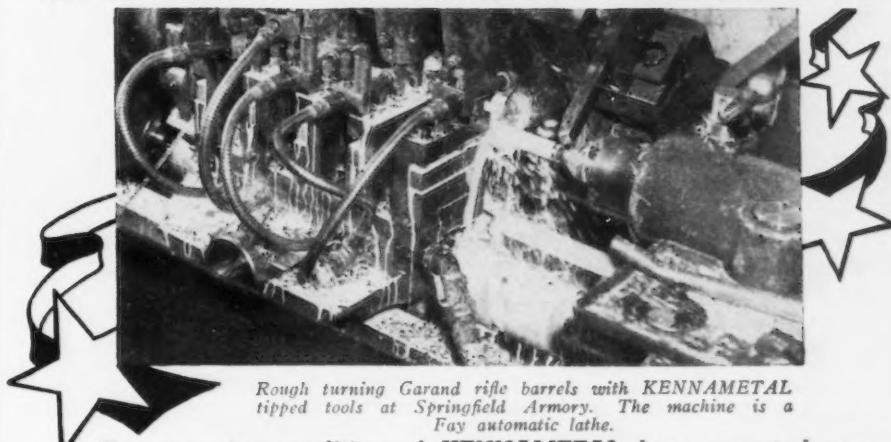
Average prices of the major non-ferrous metals in March, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley	12.00c.*
Lake copper, Eastern delivery	12.00c.
Straits tin, spot, New York	52.07c.
Zinc, East St. Louis	7.25c.
Zinc, New York	7.64c.
Lead, St. Louis	5.62c.
Lead, New York	5.77c.

*Mine producers only.

(Non-ferrous prices on page 123)

GUNS COME FIRST



Rough turning Garand rifle barrels with KENNAMETAL tipped tools at Springfield Armory. The machine is a Fay automatic lathe.

The superior qualities of KENNAMETAL have created an unprecedented demand for this hard carbide tool material—both in plants manufacturing armaments and in plants manufacturing commercial articles from steel.

We are rapidly expanding our production facilities and expect to again meet normal delivery dates within a few months. Meanwhile, the urgency of the National Defense program makes it necessary to give first consideration to orders for tools to be used in machining armaments. You can cooperate by placing your orders for KENNAMETAL tools as far in advance as possible.



Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

Although it was expected that scrap differentials on various grades and for various districts, would be announced on Tuesday by the Price Stabilization Division of the National Defense Advisory Commission, the announcement had not been made at the time this issue of THE IRON AGE went to press. All scrap prices shown on the opposite page reflect the market conditions for the week which ended Tuesday afternoon.

There were two reactions to the Government move, throughout the country: Hasty selling and suspended activity. In the principal centers dealers have made strong efforts to sell their present stocks at current prices and to clear their yards of material. In Chicago this desire resulted in a softening of quotations for No. 1 steel to \$19.50 to \$20 from a flat \$20. THE IRON AGE composite steel scrap price is, therefore, reduced from \$20.33 to \$20.25. In Pittsburgh it is stated that in the past week over 35,000 tons of scrap, mostly heavy melting material, changed hands. Philadelphia and Detroit also have taken part in the movement. Other centers have followed a course of non-activity pending the Government announcement. In New York cast grades have continued an upward trend. Quotations in all other districts are unchanged from last week.

Chicago

Prices eased slightly in the face of anticipated differentials coming from the government. Where No. 1 heavy melting steel had been difficult to get under \$20 for several weeks and where reported sales on the item had jumped all around during that time, offering prices dipped 50c. to an unexpected shortlived flurry of buying and selling following reports of what the differentials might be.

Actually, sales were made mostly in those cases where material had to be obtained, and prices were set to meet each individual transaction. But generally, the market softened slightly, even cast items sinking lower, though prices are nominal until the fixed prices appear. Rumors that prices had been withdrawn during the "waiting period" were unfounded.

Pittsburgh

Substantial tonnages of scrap, mostly No. 1 and No. 2 heavy melting, which total upward of 35,000 tons, have been sold in this district within the past week

or 10 days. This volume is in addition to the recent 35,000-ton purchase of material from the Southwest. This activity has fairly well cleaned the district of all accumulated supplies and a quiet period is expected following posting of government fixed prices which are expected at any moment. Some mills are reaching to remote districts and are using their own transportation facilities to move this material into the Pittsburgh district. Under the latter case, scrap is being picked up in non-consumption areas. The entire trade awaits clarification from Washington and Pittsburgh quotations represent transactions up to Tuesday noon of this week.

Philadelphia

While awaiting information on price differentials sellers in this district continue to turn over all the scrap obtainable to mills at quoted price levels, with No. 1 steel at \$20. The flow of scrap had increased somewhat in the past week due to better deliveries from country districts where better weather permitted more activity, although it is still not equal to the amount consumed weekly by mills.

Youngstown

Again scrap quotations are without any change here. Most activity is being held in abeyance until the new differentials come from Washington.

Cleveland

The market on Monday was in practically the same state as last week, with everyone marking time until the long-delayed differentials come out of Washington. Price quotations are nominal and unchanged.

Buffalo

The market here has seen practically no activity in the last week. Scrap is coming out about 50 per cent faster than at the corresponding time last month, but dealers admittedly are marking time while awaiting official announcement from Washington on differentials. Some relatively small sales of cast scrap and low phos. plate have been reported within the ranges quoted last week. Dealers are busy filling old orders.

St. Louis

Pending the settlement of the problem of differentials, prices of scrap iron in the St. Louis market are unchanged, with mills marking time in their commitments. Shipments from the country to local dealers have been heavy.

Cincinnati

Scrap dealers in this area continue to await word from Washington as to the establishment of differentials. In the interim they continue to operate, although the situation continues to have elements of confusion. Current bids, however, appear to be sufficiently attractive to bring in enough material to satisfy current re-

quirements, although some anxiety over future possibilities is being expressed. Consumers are taking virtually all the scrap offered to them, and shipments on contract continue to be active.

Birmingham

Flow of scrap into this market shows little variation from the past several weeks. Tonnage being received is reported as "fair" with demand for cast grades still on the increase. Prices are unchanged.

Detroit

Anticipation that scrap prices would be pegged shortly at levels below the current market quotations led most dealers to attempt seriously to clean out their yards at the prices prevailing last week. This resulted in a higher level of transactions than has been attained for some time. Automotive lists moved at the end of the month at prices reported in line with current quotations, with some specialties bringing slightly higher prices. As a whole, prices were 25c. to \$1 above those paid on the list offered 30 days ago, this is in agreement with the fact that prices have moved up approximately that much in the past month.

New York

Improved weather conditions have had a beneficial effect on the supply situation in this district. Steel scrap continues to be sold at former prices, but the strong demand for cast has raised quotations 50c. to \$1 for all cast grades. In view of the impending price regulation, however, the validity of these adjustments remains problematical.

Boston

A few turnings, bundled skeleton, blast furnace material and breakable cast was moved the past week, but in the closing days business dried up perceptibly. Everybody connected with the scrap business waited to see what Washington will do regarding stabilization of prices. Despite assurances from certain quarters that there is no shortage of scrap, it continues to come out very slowly throughout New England.

Toronto

Heavy consumers' demand, limited supplies and unsettled prices, feature local scrap markets. Machinery cast holds the centre of the stage, with foundry interests offering a maximum price of \$23.75 gross ton, and dealers demanding \$23 delivered consumers' yards. A number of dealers have contracts on hand at the latter figure and these are offering collectors \$24.75 for machinery cast. No settlement is in sight regarding the cast situation, although it is stated that consumers have not been successful in obtaining supplies at their maximum price. Heavy demand prevails for steel grades from mills and electric furnace operators. Better offerings to dealers are reported, but demand continues in excess of supply.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$21.00
Railroad heavy mltng.	\$21.00 to 21.50
No. 2 heavy melting.	20.00
Railroad scrap rails.	22.00 to 22.50
Rails 2 ft. and under.	26.50 to 27.00
Comp. sheet steel.	21.00
Hand bundled sheets.	20.00
Heavy steel axle turn.	20.00 to 21.00
Heavy steel forge turn.	19.00 to 20.00
Machine shop turnings.	16.00 to 16.50
Short shov. turn. alloy	free 17.00 to 17.50
Mixed bor. & turn.	17.00 to 17.50
Cast iron borings.	17.50 to 18.00
Cast iron carwheels.	23.00 to 23.50
Heavy breakable cast.	19.50 to 20.00
No. 1 cupola cast.	23.00 to 23.50
RR. knuckles & coup.	25.50 to 26.00
Rail coil springs.	26.50 to 27.00
Rail leaf springs.	26.50 to 27.00
Rolled steel wheels.	26.50 to 27.00
Low phos. billet crops.	26.50 to 27.00
Low phos. punchings.	26.50 to 27.00
Low phos. heavy plate.	25.50 to 26.00
Railroad malleable.	26.00 to 26.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$20.00
No. 2 hvy. mltng. steel.	19.00
Hydraulic bund. new.	20.00
Hydraulic bund., old.	\$17.50 to 18.00
Steel rails for rolling.	23.50
Cast iron carwheels.	24.00
Hvy. breakable cast.	24.00
No. 1 cupola cast.	25.50 to 26.00
Mixed yard (fd'y) cast.	24.50
Stove plate (steel wks.)	21.00
Railroad malleable.	23.50 to 24.00
Machine shop turn.	15.00 to 15.50
No. 1 blast furnace.	14.50 to 15.00
Cast borings.	17.00 to 17.50
Heavy axle turnings.	19.50 to 20.00
No. 1 low phos. hvy.	26.50 to 27.00
Couplers & knuckles.	26.50 to 27.00
Rolled steel wheels.	26.50 to 27.00
Steel axles.	25.00 to 25.50
Shafting.	25.00 to 25.50
Spec. iron & steel pipe.	18.00 to 18.50
Cast borings (chem.).	17.50 to 18.00

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel.	\$19.50 to \$20.00
Auto. hvy. mltng. steel	
alloy free.	18.50 to 19.00
No. 2 auto. steel.	16.50 to 17.00
Shoveling steel.	19.50 to 20.00
Factory bundles.	19.00 to 19.50
Dealers' bundles.	18.00 to 18.50
No. 1 busheling.	18.50 to 19.00
No. 2 busheling, old.	10.50 to 11.00
Rolled carwheels.	22.50 to 23.00
Railroad tires, cut.	23.00 to 23.50
Railroad leaf springs.	22.50 to 23.00
Steel coup. & knuckles.	22.50 to 23.00
Axle turnings.	18.75 to 19.25
Coil springs.	24.00 to 24.50
Axle turn. (elec.).	19.75 to 20.00
Low phos. punchings.	23.00 to 23.50
Low phos. plates 12 in. and under.	23.25 to 23.75
Cast iron borings.	15.00 to 15.50
Short shov. turn.	15.00 to 15.50
Machine shop turn.	13.75 to 14.25
Rerolling rails.	24.00 to 24.50
Steel rails under 3 ft.	23.50 to 24.00
Steel rails under 2 ft.	24.50 to 25.00
Angle bars steel.	23.00 to 23.50
Cast iron carwheels.	20.00 to 20.50
Railroad malleable.	24.50 to 25.00
Agric. malleable.	17.50 to 18.00
Per Net Ton	
Iron car axles.	\$23.50 to \$24.00
Steel car axles.	25.50 to 26.00
Locomotive tires.	18.00 to 18.50
Pipes and flues.	14.00 to 14.50
No. 1 machinery cast.	21.00 to 21.50
Clean auto. blocks.	19.50 to 20.00
No. 1 railroad cast.	17.75 to 18.25
No. 1 agric. cast.	16.50 to 17.00
Stove plate.	14.50 to 15.00
Grate bars.	14.00 to 14.50
Brake shoes.	15.00 to 15.50

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$20.50 to \$21.50
No. 2 hvy. mltng. steel.	19.25 to 20.25
Low phos plate.	24.00 to 24.50
No. 1 busheling.	20.00 to 20.50
Hydraulic bundles.	20.25 to 21.25
Machine shop turn.	15.50 to 16.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$20.00 to \$21.00
No. 2 hvy. mltng. steel.	19.00 to 20.00

Comp. sheet steel.	\$19.50 to \$20.50
Light bund. stampings.	15.00 to 15.50
Drop forge flashings.	19.00 to 19.50
Machine shop turn.	13.50 to 14.00
Short shov. turn.	16.25 to 16.75
No. 1 busheling.	19.25 to 19.75
Steel axle turnings.	19.50 to 20.00
Low phos. billet and bloom crops.	24.50 to 25.00
Cast iron borings.	16.25 to 16.75
Mixed bor. & turn.	16.25 to 16.75
No. 2 busheling.	15.00 to 15.50
No. 1 machinery cast.	24.00 to 24.50
Railroad cast.	23.50 to 24.00
Railroad grate bars.	15.00 to 15.50
Stove plate.	15.00 to 15.50
Short rails, 2 ft. under.	26.75 to 27.25
Rails for rolling.	25.50 to 26.00
Railroad malleable.	24.50 to 25.00

BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$21.00 to \$21.50
No. 2 hvy. mltng. steel.	19.00 to 19.50
Scrap rails.	22.00 to 22.50
New hvy. b'ndled sheets.	19.00 to 19.50
Old hydraul. bundles.	17.50 to 18.00
Drop forge flashings.	19.00 to 19.50
No. 1 busheling.	19.00 to 19.50
Machine shop turn.	13.50 to 14.00
Shov. turnings.	16.00 to 16.50
Mixed bor. & turn.	14.50 to 15.00
Cast iron borings.	14.50 to 15.00
Knuckles & couplers.	25.00 to 25.50
Coil & leaf springs.	25.00 to 25.50
Rolled steel wheels.	25.00 to 25.50
No. 1 machinery cast.	22.50 to 23.00
No. 1 cupola cast.	21.00 to 21.50
Stove plate.	18.00 to 18.50
Steel rails under 3 ft.	27.00 to 27.50
Cast iron carwheels.	21.50 to 22.50
Railroad malleable.	24.00 to 24.50
Low phos. plate.	26.50 to 27.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:	
Selected hvy. melting.	\$18.00 to \$18.50
No. 1 hvy. melting.	17.50 to 18.00
No. 2 hvy. melting.	16.50 to 17.00
No. 1 locomotive tires.	20.00 to 20.50
Misc. stand. sec. rails.	20.00 to 20.50
Railroad springs.	22.00 to 22.50
Bundled sheets.	13.00 to 13.50
Cast bor. & turn.	10.50 to 11.00
Machine shop turn.	11.00 to 11.50
Heavy turnings.	14.50 to 15.00
Rails for rerolling.	21.50 to 22.00
Steel car axles.	25.50 to 26.00
No. 1 RR wrought.	14.25 to 14.75
No. 2 RR. wrought.	16.50 to 17.00
Steel rails under 3 ft.	24.00 to 24.50
Steel angle bars.	21.50 to 22.00
Cast iron carwheels.	21.50 to 22.00
No. 1 machinery cast.	20.00 to 20.50
Railroad malleable.	20.50 to 21.50
Breakable cast.	18.00 to 18.50
Stove plate.	15.50 to 16.00
Grate bars.	14.50 to 15.00
Brake shoes.	14.50 to 15.00

CINCINNATI

Dealers' buying prices per gross ton at yards:	
No. 1 hvy. mltng. steel.	\$18.25 to \$18.75
No. 2 hvy. mltng. steel.	16.25 to 16.75
Scrap rails for melting.	23.25 to 23.75
Loose sheet clippings.	12.75 to 13.25
Hyd'le bundled sheets.	17.00 to 17.50
Cast iron borings.	9.25 to 9.75
Machine shop turn.	10.00 to 10.50
No. 1 busheling.	14.25 to 14.75
No. 2 busheling.	7.75 to 8.25
Rails for rolling.	24.50 to 25.00
No. 1 locomotive tires.	20.25 to 20.75
Short rails.	26.25 to 26.75
Cast iron carwheels.	18.75 to 19.25
No. 1 machinery cast.	22.25 to 22.75
No. 1 railroad cast.	20.50 to 21.00
Burnt cast.	12.75 to 13.25
Stove plate.	12.75 to 13.25
Agric. malleable.	18.00 to 18.50
Railroad malleable.	21.00 to 21.50
Mixed hvy. cast.	19.25 to 19.75
Per Net Ton	
Iron car axles.	\$23.50 to \$24.00
Steel car axles.	25.50 to 26.00
Locomotive tires.	18.00 to 18.50
Pipes and flues.	14.00 to 14.50
No. 1 machinery cast.	21.00 to 21.50
Clean auto. blocks.	19.50 to 20.00
No. 1 railroad cast.	17.75 to 18.25
No. 1 agric. cast.	16.50 to 17.00
Stove plate.	14.50 to 15.00
Grate bars.	14.00 to 14.50
Brake shoes.	15.00 to 15.50

BIRMINGHAM

Per gross ton delivered to consumer:	
No. 1 hvy. melting steel.	\$18.00
No. 2 hvy. melting steel.	17.00
No. 1 busheling.	16.00
Scrap steel rails.	18.00
Steel rails under 3 ft.	20.00
Long turnings.	9.50
Cast iron borings.	8.50
Stove plate.	13.50
Steel axles.	18.00
No. 1 RR. wrought.	16.00
No. 1 cast.	19.50
No. 2 cast.	14.50
Cast iron carwheels.	19.00
Steel carwheels.	18.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:	
No. 1 heavy melting.	\$16.50 to \$17.00
No. 2 heavy melting.	15.50 to 16.00
Borings and turnings.	12.50 to 13.00
Machine shop turnings.	11.50 to 12.00
Long turnings.	10.00 to 10.50
Short shov. turnings.	13.00 to 13.50
No. 1 cast.	20.00 to 21.50
Automotive cast.	21.50 to 22.00
Hvy. breakable cast.	18.50 to 19.00
Stove plate.	13.00 to 13.50
Hydraul. comp. sheets.	17.75 to 18.25
New busheling.	16.50 to 17.00
Sheet clips.	13.75 to 14.25
Flashings.	16.50 to 17.00
Low phos. plate.	19.00 to 19.50

NEW YORK

Dealers' buying prices per gross ton on cars:	

<tbl_r cells="

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings jump to 47,410 tons from 17,400 tons last week; new projects slightly lower at 31,725 tons; plate awards total 16,150 tons.

AWARDS

NORTH ATLANTIC STATES

3000 Tons, Chester, Pa., shipways for Sun Shipbuilding Corp., 2400 tons to Bethlehem Steel Co., Bethlehem, Pa., 2400 tons to American Bridge Co., Pittsburgh.
 2000 Tons, Philadelphia, press building, Midvale Steel Co., to Bethlehem Steel Co., Bethlehem, Pa.
 1100 Tons, Schenectady, N. Y., building for G. E. Realty Corp., to Ingalls Iron Works Co., Birmingham.
 1000 Tons, Rockaway, L. I., viaduct for Long Island Railroad Co., to Harris Structural Steel Co., New York; Charles F. Vachris, Inc., Brooklyn, contractor.
 700 Tons, Brooklyn, Methodist Hospital, to Harris Structural Steel Co., New York.
 675 Tons, Lewes, Del., Army buildings, to American Bridge Co., Pittsburgh.
 500 Tons, Burlington, N. J., turbine generator foundation, Public Service Electric & Gas Co., to Bethlehem Steel Co., Bethlehem, Pa.
 500 Tons, Brooklyn, addition, Atlantic Basin Iron Works, to American Bridge Co., Pittsburgh.
 500 Tons, McKeesport, Pa., G. C. Murphy Co., warehouse, to Bethlehem Steel Co., Bethlehem, Pa.
 500 Tons, Buffalo, addition to buildings Nos. 25 and 61 for National Aniline & Chemical Co., to Ernst Iron Works, Buffalo.
 450 Tons, Little Compton and Point Judith, R. I., trusses and beams for War Dept., to American Bridge Co., Pittsburgh.
 450 Tons, New York, 40 Central Park South, apartment building, to Fischer Steel Corp., New York; J. H. Taylor Construction Co., New York, contractor.
 350 Tons, Upper Darby, Pa., school, to Lehigh Structural Steel Co., Allentown, Pa.
 300 Tons, Geneva, N. Y., Geneva Foundry Co., rebuilding plant destroyed by fire, to American Bridge Co., Pittsburgh.
 300 Tons, Jersey City, turbine generator foundation, Public Service Electric & Gas Co., to Bethlehem Steel Co., Bethlehem, Pa.
 240 Tons, Hartford, Conn., State bridge, Front Street, to American Bridge Co., Pittsburgh.
 260 Tons, Quincy, Mass., Fore River works pipe shop extension, to West End Iron Works, Cambridge, Mass.
 150 Tons, Lackawanna, N. Y., bridge L-264 for New York Central Railroad Co., to American Bridge Co., Pittsburgh.
 150 Tons, Boston, Brighton district, Coca-Cola Bottling Co. plant, to A. O. Wilson Structural Co., Cambridge, Mass.
 130 Tons, Passaic, N. J., leanto building for

Magor Car Corp., to American Bridge Co., Pittsburgh.

125 Tons, Brooklyn, disposal platform extension, Van Dam Street, to Weatherly Steel Co., Weatherly, Pa.
 110 Tons, Newark, Del., dormitory, University of Delaware, to Anthracite Bridge Co., Scranton, Pa.

THE SOUTH

10,300 Tons, Atlanta, Ga., warehouses for Atlanta General Depot, to Bethlehem Steel Co., Bethlehem, Pa., through A. F. Blair Co.
 1750 Tons, Houston, Tex., plate shop for Rust Engineering Co., to Mosher Steel Co., Dallas.
 1540 Tons, Narrows, Va., five buildings for Celanese Co., to Ingalls Iron Works Co., Pittsburgh plant.
 1000 Tons, Norfolk, Va., seaplane hangar, to Bethlehem Steel Co., Bethlehem, Pa.
 1000 Tons, State of West Virginia, 23 bridges for Baltimore & Ohio Railroad Co., to American Bridge Co., Pittsburgh.
 430 Tons, Mobile, Ala., power house for Aluminum Ore Co., to Ingalls Iron Works Co., Pittsburgh plant.
 429 Tons, Emco, Ala., furnace building No. 2 for Electro Metallurgical Co., to Ingalls Iron Works Co., Pittsburgh plant.
 180 Tons, Atlanta, Ga., shirt factory for Cluett, Peabody & Co., Inc., to Ingalls Iron Works Co., Birmingham.
 180 Tons, Chattanooga, Tenn., machine shop for Combustion Engineering Co., to Converse Steel Co.

CENTRAL STATES

6000 Tons, St. Louis, munitions plant, to Mississippi Valley Structural Steel Co., St. Louis.
 700 Tons, Lafayette, Ind., additional buildings at ordnance plant, to Bethlehem Steel Co.
 670 Tons, Jeffersonville, Ind., warehouses, to Gage Structural Steel Co., Chicago.
 640 Tons, Detroit, extension to hammer and die shop for Chrysler Corp., to Whitehead & Kales Co., Detroit.
 240 Tons, Cincinnati, extension to Corcoran Brown Lamp Division, to Bethlehem Steel Co., Bethlehem.
 180 Tons, Dayton, Ohio, transmission towers for Dayton Power & Light Co., to Blaw-Knox Co., Pittsburgh.
 140 Tons, Akron, Ohio, mill building for Firestone Tire & Rubber Co., to International Steel Co., Evansville, Ind.
 115 Tons, Port Huron, Mich., coal silo for Detroit-Edison Co., to Muskegon Boiler Works, Muskegon, Mich.

WESTERN STATES

2800 Tons, Long Beach, Cal., assembly shop and buildings for Navy, to American Bridge Co., Pittsburgh.
 2000 Tons, Longview, Wash., Reynolds Metals Co. plant, to Virginia Bridge Co., Roanoke, Va.
 1500 Tons, Oakland, Cal., Navy airplane storage, to Columbia Steel Co., San Fran-

cisco, through Clinton Construction Co., San Francisco, contractor.

600 Tons, Long Beach, Cal., Douglas Aircraft Co. building, to Kyle Steel Construction Co., Los Angeles.

245 Tons, Long Beach, city list for bulkhead at Pier D, miscellaneous materials (Specification HD-109-A, sections B and C), to Columbia Steel Co., Los Angeles.

215 Tons, Odair, Wash., tower assemblies, Grand Coulee Dam (Specification 1489-D), to Bethlehem Steel Co., Bethlehem, Pa.

200 Tons, North Hollywood, Cal., telephone building, to Union Iron & Steel Co., Los Angeles.

200 Tons, San Diego, Cal., Navy destroyer base brig, to Kyle Steel Construction Co., Los Angeles.

162 Tons, Los Angeles, Union Hardware & Metal Co. storage building, to Apex Steel Corp., Ltd., Los Angeles.

150 Tons, Richmond, Cal., gantry cranes for Todd-California Shipbuilding Corp., to Judson-Pacific Co., San Francisco.

150 Tons, Bakersfield, Cal., Kern County High School auditorium, to Kyle & Co., Fresno, Cal.

100 Tons, Portland, Ore., Tidewater Associated Oil Co. tank yard, to Columbia Steel Co., Portland.

100 Tons, Seattle, Todd Drydocks copper building, to Isaacson Iron Works, Seattle.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

4700 Tons, Wireton, Pa., Frank R. Phillips power station for Duquesne Light Co.

4500 Tons, Bayonne, N. J., drydock tremie trusses for Navy Department.

2500 Tons, Allegheny County, Pa., State highway bridge LR-187; bids taken.

1800 Tons, Providence, R. I., building addition for New England Telephone & Telegraph Co.

1700 Tons, Coatesville, Pa., diesel engine frame building for Lukenweld, Inc.

1400 Tons, New York, viaduct, East River Drive, East 45th, East 50th Sts.

900 Tons, Bristol, Pa., aircraft parts assembly plant for Fleetwings, Inc.

600 Tons, Buffalo, addition to Millard Fillmore Hospital.

600 Tons, Niagara Falls, N. Y., plant expansion for Pittsburgh Metallurgical Co.

550 Tons, Quincy, Mass., storehouse for shipyard; bids taken.

400 Tons, Middle River, Md., State underpass.

400 Tons, Buffalo, public school to replace Schools 25 and 40.

390 Tons, Baltimore, 1941 soap plant extension for Lever Bros. Co.

375 Tons, Corning, N. Y., building for Corning Glass Works.

350 Tons, Buffalo, Miller Avenue grade crossing; bids taken.

320 Tons, Lancaster, Pa., office and factory extension for Hamilton Watch Co.

250 Tons, Ballston, N. Y., bridge No. 29.37 for Delaware & Hudson Railroad.

175 Tons, Washington County, Pa., State highway overpass LR-181.

Weekly Bookings of Construction Steel

Week Ended →	Apr. 1,	Mar. 25,	Mar. 4,	Apr. 2,	Year to Date
Fabricated structural steel awards	1941	1941	1941	1940	1941
Fabricated plate awards	47,410	17,400	11,100	8,750	423,685
Steel sheet piling awards	16,150	200	360	2,685	204,310
Reinforcing bar awards	7,435	230	190	1,400	49,005
	14,960	9,700	14,400	10,100	12,880
Total Letting of Construction Steel	85,955	27,530	26,050	22,935	105,670
					360,170

THE SOUTH

520 Tons, Pointe Coupee Parish, La., bridge for New Orleans, Texas & Mexico Railroad; bids April 30.
220 Tons, Berwick-Morgan City, La., raising Berwick Bay bridge.

CENTRAL STATES

4167 Tons, Massillon, Ohio, flood control project, E. J. Albrecht, Chicago, low on general contract.
4000 Tons, Chicago, superstructure, Chicago River bascule bridge.
1600 Tons, Wood River, Ill., power plant for Standard Oil Co. of Indiana.
750 Tons, Akron, Ohio, building for Goodyear Tire & Rubber Co.
600 Tons, Sandusky, Ohio, Plum Brook ordnance works; E. B. Badger & Sons Co., Boston, engineer.
500 Tons, Aurora, Ill., power plant addition, unit No. 6 for Western United Gas & Electric Co.
310 Tons, Plainwell, Mich., State bridge FB-2 of 3-8-1.
300 Tons, Dearborn, Mich., factory addition for Universal Products Co.
300 Tons, Cleveland, buildings for Cleveland Hobbing Machine Co.
290 Tons, South Haven, Mich., State bridge FB-1 of 80-17-7.
200 Tons, Detroit, building No. 4, shed and shipping building for American Brass Co.
160 Tons, Detroit, lunch and wash room building for Ford Motor Co.

WESTERN STATES

500 Tons, Fresno, Cal., municipal airport.
150 Tons, Seattle, bridges for Alaska Road Commission (Invitation 08775).

FABRICATED PLATES

AWARDS

13,000 Tons, Detroit, ore carriers for Pittsburgh Steamship Co., to Carnegie-Illinois Steel Corp., Pittsburgh, through Great Lakes Engineering Works.
641 Tons, Cleveland, city water main; 3000 ft. of 20-in. and 8500 ft. of 24-in. pipe; to Bethlehem Steel Co., Bethlehem, Pa.
588 Tons, Pascagoula, Miss., three barges for Colle Towing Co., to Ingalls Shipbuilding Corp., Decatur, Ala., shipyards.
500 Tons, San Francisco, oil tanks for Bay Region refinery, to Western Pipe & Steel Co., San Francisco.
340 Tons, Portland, Ore., Tidewater Associated Oil Co. tanks, to Steel Tank & Pipe Co. of Oregon, Portland.
300 Tons, Phoenix, Ariz., elevated water tank at Phoenix Military Airport, to Darby Products & Steel Plate Corp., Kansas City, Kan. Tonnage includes shapes.
300 Tons, Las Vegas, Nev., elevated water tank at Las Vegas airport, to Darby Products & Steel Plate Corp., Kansas City, Kan. Tonnage includes shapes.
275 Tons, Moscow, Idaho, elevated water tank, to Pittsburgh-Des Moines Steel Co., San Francisco. Tonnage includes shapes.
204 Tons, Charleston, S. C., two deck barges for West Virginia Pulp & Paper Co., to Ingalls Shipbuilding Corp., Decatur, Ala., shipyards.

PENDING PROJECTS

250 Tons, San Francisco, pressure vessels for Bay Region refinery.
210 Tons, Redding, Cal., floor plates for Pit River bridge (Invitation A-33,172-A); Alan Wood Steel Co., Norristown, Pa., low bidder.

SHEET PILING

AWARDS

4800 Tons, Chester, Pa., shipways for Sun Shipbuilding Corp., 2400 tons to Bethlehem Steel Co., Bethlehem, Pa., 2400 tons to American Bridge Co., Pittsburgh.
2033 Tons, Long Beach, Cal., city list for bulkhead at Pier D (Specification HD-109-A, section A), to Columbia Steel Co., Los Angeles.
600 Tons, Mare Island, Cal., mine handling and waterfront facilities, to Columbia Steel Co., San Francisco, through Cahill Brothers and Ben C. Gerwick, Inc., San Francisco, contractors.

PENDING PROJECTS

700 Tons, Massillon, Ohio, flood control project; E. J. Albrecht, Chicago, low on general contract.

Reinforcing Steel

Awards of 14,960 tons; 22,700 tons in new projects.

AWARDS

ATLANTIC STATES

5000 Tons, Brooklyn, Fort Green housing, to Bethlehem Steel Co., Bethlehem, Pa., through Fireproof Products Corp.; Corbett Construction Co., contractor.
2000 Tons, Philadelphia, Navy Yard drydock, to Jones & Laughlin Steel Corp., Pittsburgh; Dry Dock Associates, contractor.
420 Tons, Queens, N. Y., bridge contract 2AG-5525, Department of Parks, to Bethlehem Steel Co., Bethlehem, Pa.; Laurence J. Rice, New York, contractor.
156 Tons, Hatboro, Pa., assembly plant for Brewster Aeronautical Co., to Truscon Steel Co., Youngstown, through George A. Fuller Co., contractor.
150 Tons, Boston, Brighton district, Coca Cola Bottling Co. plant, to Truscon Steel Co., Boston.
122 Tons, Dannemora, N. Y., prison cell blocks, to Truscon Steel Co., Youngstown, through Thomas C. Brown Co.
100 Tons, Eastford-Pomfret, Conn., State road, to Truscon Steel Co., Boston, through M. A. Gammino Construction Co., Providence, R. I., contractor.
100 Tons, Newington - Wethersford, Conn., State road, to Truscon Steel Co., Boston, through D. V. Frione & Co., Inc., New Haven, Conn., contractor.
100 Tons, Willowbrook, N. Y., State school tunnels, to Bethlehem Steel Co., Bethlehem, Pa.; Caye Construction Co., contractor.

SOUTH AND CENTRAL

450 Tons, South Boston, Navy Yard annex, Merritt, Chapman & Scott, New York, contractor.
250 Tons, Hatboro, Pa., Warminster Corp. Aero factory; George A. Fuller Co., contractor.
110 Tons, New York, contract 6801, Dept. of Sewers, Turiano Foundation Co., Bronx, contractor.
105 Tons, Long Island Railroad grade elimination contract No. 6; Charles F. Vachris, Inc., Brooklyn, contractor.
100 Tons, West Springfield, Mass., Bridge Street pumping station, J. G. Roy & Sons, Springfield, contractors.

SOUTH AND CENTRAL

6000 Tons, Fort Wingate, N. M., ammunition depot; Allison-Smith-Fellows & Armstrong, contractors.
5125 Tons, Pointe Coupee Parish, La., bridge for New Orleans, Texas & Mexico Railroad Co.; bids April 30.
4000 Tons, Omaha, Glenn L. Martin assembly plant; Peter Kiewit & Sons, contractors.
1500 Tons, East Chicago, Ind., Socony-Vacuum Oil Co. refinery; Lummus Co., contractor.
938 Tons, Huntington, W. Va., two pumping stations for U. S. Engineer.
370 Tons, Massillon, Ohio, flood control project, E. J. Albrecht, Chicago, low bidder on general contract.
350 Tons, Milwaukee, Schuster's stores warehouse.
250 Tons, Rock Island, Ill., U. S. arsenal shop buildings.
200 Tons, Indianapolis, Oaklunden reservoir. Unstated Tonnage, Toledo, Birmingham Terrace homes; Lovering Construction Co., St. Paul, general contractor.

WESTERN STATES

790 Tons, San Francisco, Valencia Gardens housing project; bids in.
186 Tons, Concord, Cal., Central Valley project (Invitation 49,217-A); bids taken.
145 Tons, Santa Fe, N. M., Public Roads Administration bridge; bids in.
130 Tons, Odair, Wash., Columbia Basin project (Invitation C-38,251-A); Bethlehem Steel Co., San Francisco, only bidder.
107 Tons, Oakland, Cal., East Bay Municipal Utility District list; bids in.

Pipe Lines

Standard Oil of New Jersey, 26 Broadway, and Shell Oil Co., 50 West Fifth Street, both New York, and Standard Oil Co. of Kentucky, 426 West Bloom Street, Louisville, are considering plans for joint construction of new welded steel pipe line from Baton Rouge, La., to Greensboro, N. C., and vicinity, about 1260 miles, for gasoline transmission. Proposed line will consist of 436 miles of 11-in. pipe, 360 miles of 9-in., 210 miles of 6-in., and 255 miles of 4-in., and will be built between two points noted by way of Meridian, Miss.; Birmingham, Montgomery and Oxford, Ala.; Chattanooga and Knoxville, Tenn., all of which will be served by system. Line will have capacity of close to 50,000 bbl. of gasoline daily, to be secured from Standard oil refinery at Baton Rouge, and Shell refining plant at Norco, La. Project will include 14 pumping stations for booster service and terminal facilities at municipalities noted. Cost over \$15,000,000.

Oklahoma Natural Gas Co., 401 North Harvey Street, Oklahoma City, plans extensions in pressure pipe line system to Bethany airport, for gas transmission for service at that point. Cost about \$45,000.

Constructing Quartermaster, Maxwell Field, Montgomery, Ala., asks bids until April 10 for 64,974 ft. of galvanized welded steel pipe; also for 19,033 malleable iron pipe fittings, pipe caps, valves, etc. (Circular 6425-62).

Bureau of Reclamation, Washington, has awarded contract to Albert Pipe Supply Co., Berry and North Thirteenth Streets, Brooklyn, at \$32,323, for fabricated steel pipe, with fittings, valves, etc., for Grand Coulee hydroelectric power plant, Columbia Basin project, Wash. (Specifications 1475-D).

State Department of Construction and Engineering, Frankfort, Ky., plans underground pressure pipe line system for steam distribution at Central State Hospital, Lakeland, Ky. Ralph C. Wyatt is chief engineer.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	DELIVERED TO														
	Pitts- burgh	Chi- cago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phi- la- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE 29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10¢)			
TERNES, M'FG. Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢	2.29¢	2.15¢	
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢					(Coatesville = 3.50¢)								
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
WIRE⁹ Bright	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)						
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)						
Spring	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)						
PILING Steel sheet	2.40¢	2.40¢					2.40¢					2.95¢			
IRON BARS Common		2.25¢							(Terre Haute, Ind. = 2.15¢)						
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling	\$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer

\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared

1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland

2.00c.

Worcester, Mass.

2.10c.

Birmingham

2.00c.

San Francisco

2.50c.

Galveston

2.25c.

9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

20x14 in. 20x28 in.

8-lb. coating I.C. \$6.00 \$12.00

15-lb. coating I.C. 7.00 14.00

20-lb. coating I.C. 7.50 15.00

25-lb. coating I.C. 8.00 16.00

30-lb. coating I.C. 8.63 17.25

40-lb. coating I.C. 9.75 19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago,

Cleveland, Birmingham)

Base per Keg

Standard wire nails

\$2.55

Coated nails

2.55

Cut nails, carloads

3.85

Base per 100 Lb.

Annealed fence wire

\$3.05

Base Column

Woven wire fence* 67

Fence posts (carloads) 69

Single loop bale ties 59

Galvanized barbed wire† 70

Twisted barbless wire 70

*15 1/2 gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:

1/2 in. and smaller by 6 in. and shorter 68

9/16 and 5/8 in. by 6 in. and shorter 66

5/8 to 1 in. by 6 in. and shorter 64

1 1/8 in. and larger, all lengths 62

All diameters over 6 in. long 62

Lag, all sizes 65

Plow bolts	68 1/2
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
1/2 in. and smaller	66
9/16 to 1 in. inclusive	63
1 1/8 to 1 1/2 in. inclusive	61
1 1/8 in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
1/2 in. and smaller	66	70
9/16 to 1 in.	63	65
1 1/8 in. through 1 1/2 in.	61	62
1 1/8 in. and larger	60	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose

73 and 100

Stove bolts in packages, with nuts attached

73

Stove bolts in bulk

81

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)
Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.40
---	--------

Small Rivets

(7/16 in. and smaller)
Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10
---	-----------

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws,

1 in. dia. and smaller 50

Milled headless set screws, cut

thread 1/4 in. and larger 64

3/16 in. and smaller 73

Upset hex. head cap screws U.S.S.

or S.A.E. thread 1 in. and

smaller 68

Upset set screws, cup and oval

points 74

Milled studs 52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Mar. 26	Mar. 27	Mar. 28	Mar. 29	Mar. 31	Apr. 1
Copper, Electrolytic ¹	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York ²	52.50	52.625	52.625	52.00	51.75	
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis ³	5.70	5.70	5.70	5.70	5.70	5.70

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct 1/4c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits pig	53.00	55.00

Copper		
Electro	13.00	14.50
Castings	12.50	13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62

Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40

Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	Nom'al	Nom'al

Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	9.10

Antimony		
Asiatic	16.00	17.00

Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50

Solder		
1/2 and 1/2		

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem \$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Alloy
Series Differential,
Numbers per 100 Lb.
2000 (1.5 Ni) \$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.
Open hearth grade 3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No. 410	430	442	446	
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'l'd st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

No. 304	50c.
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

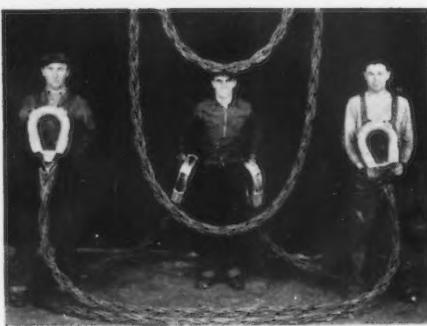
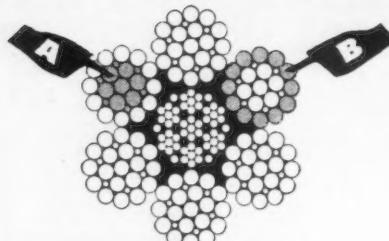
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CRANE ROPES

Made With 2 Kinds of Wire for EXTRA STAMINA



BRAIDED SLINGS

Made from left-&-right lay endless wire ropes . . . they SPEED MATERIALS HANDLING.

Extremely flexible . . . light weight . . . kink-resisting . . . non-spinning . . . easy-to-handle . . . SAFE! That, users say, fits Macwhyte ATLAS Slings to a T, thanks to their special braided construction.

Get full particulars today—you'll need these slings tomorrow—literature and catalog await your request—be prepared.

USE THE CORRECT ROPES FOR YOUR EQUIPMENT
Macwhyte
CRANE ROPES

SPEED YOUR DEFENSE CONTRACTS SAFELY . . . WITH
Macwhyte
ATLAS BRAIDED WIRE ROPE
★ SLINGS ★

MACWHYTE COMPANY

2911 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of Rope Wire, Braided Wire Rope Slings, Monel Metal and Stainless Steel Wire Rope, Aircraft Cable, 'Safe-Lock' Cable Terminals, Aircraft Tie-Rods, and Wire Rope for all requirements.

New York • Pittsburgh • Chicago • Ft. Worth • San Francisco • Portland • Seattle
Distributors throughout the U. S. A.

NO. 523-S

Speed Your Defense Contracts With Macwhyte

PRICES

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

Lap
Seamless Weld,
Cold Hot Hot
Drawn Rolled Rolled

1 in. o.d.13 B.W.G.	\$9.01	\$7.82	...
1 1/4 in. o.d.13 B.W.G.	10.67	9.26	...
1 1/2 in. o.d.13 B.W.G.	11.70	10.23	\$9.72
1 3/4 in. o.d.13 B.W.G.	13.42	11.64	11.06
2 in. o.d.13 B.W.G.	15.03	13.04	12.38
2 1/4 in. o.d.13 B.W.G.	16.76	14.54	13.79
2 1/2 in. o.d.12 B.W.G.	18.45	16.01	15.16
2 1/2 in. o.d.12 B.W.G.	20.21	17.54	16.58
2 1/2 in. o.d.12 B.W.G.	21.42	18.59	17.54
3 in. o.d.12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d.11 B.W.G.	28.37	24.62	23.15
4 in. o.d.10 B.W.G.	35.20	30.54	28.66
4 1/2 in. o.d.10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = \$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
1/8 in.	56	36
1/4 to 3/8 in.	59	43 1/2
1/2 in.	63 1/2	54
3/4 in.	66 1/2	58
1 to 3 in.	68 1/2	60 1/2

Wrought Iron	Black	Galv.
1/4 and 3/8 in.	+9	+10
1/2 in.	24	6 1/2
3/4 in.	30	13
1 and 1 1/4 in.	34	19
1 1/2 in.	38	21 1/2
2 in.	37 1/2	21

Lap Weld

Steel	Black	Galv.
2 in.	61	52 1/2
2 1/2 and 3 in.	64	55 1/2
3 1/2 to 6 in.	66	57 1/2
7 and 8 in.	65	55 1/2
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron	Black	Galv.
2 in.	30 1/2	15
2 1/2 to 3 1/2 in.	31 1/2	17 1/2
4 in.	33 1/2	21
4 1/2 to 8 in.	32 1/2	20
9 to 12 in.	28 1/2	15

Butt weld, extra strong, plain ends		
Steel	Black	Galv.
1/8 in.	54 1/2	41 1/2
1/4 to 3/8 in.	56 1/2	45 1/2
1/2 in.	61 1/2	53 1/2
3/4 in.	65 1/2	57 1/2
1 to 3 in.	67	60

Wrought Iron		
1/4 and 3/8 in.	+10	+43
1/2 in.	25	9
3/4 in.	31	15
1 to 2 in.	38	22 1/2

Lap weld, extra strong, plain ends		
Steel	Black	Galv.
2 in.	59	51 1/2
2 1/2 and 3 in.	63	55 1/2
3 1/2 to 6 in.	66 1/2	59

	Black	Galv.
7 and 8 in.	65 1/2	56
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron		
2 in.	33 1/2	18 1/2
2 1/2 to 4 in.	39	25 1/2
4 1/2 to 6 in.	37 1/2	24
7 and 8 in.	38 1/2	24 1/2
9 to 12 in.	32	20 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

CASTINGS

Finished or Unmachined

Steel castings unmachined, machined, or flame-hardened are produced promptly in our foundries and machine shops to keep your maintenance parts in line with any emergency which may arise in filling DEFENSE ORDERS. The open hearth foundries and the electric steel foundries are set up that special rush orders can be handled promptly without disturbing regular line production... Neloy and Neloy-Molybdenum Steel castings are specialized products of the National-Erie Corporation with complete control from the raw material to finished products.

NATIONAL-ERIE

CORPORATION

ERIE, PA., U.S.A.

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%	\$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore,
Exclusive of Duty

Per Unit

African, Indian, 44 to 48% Mn.	57c. to 61c.
--------------------------------	--------------

African, Indian, 49 to 51% Mn.	60c. to 65c.
Brazilian, 46 to 48% Mn.	.54c. to .59c.
Cuban, del'd, duty free, 51% Mn.	67½c. to 71c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	.... \$23 to \$24
Tungsten, domestic, scheelite, delivered	.... \$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South	
African (low grade)	.... Nom.
Rhodesian, 45%	.... \$25.00
Rhodesian, 48%	.... \$28.00 to \$30.00

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	.... \$40.00
Angle bars, 100 lb.	.... 2.70

F.o.b. Basing Points

Light rails (from rail steel), gross ton	.... 39.00
Cut spikes	.... 3.00c.

Screw spikes

Tie plates, steel

Tie plates, Pacific Coast

Track bolts, steam railroads

Track bolts, discount to jobbers

all sizes (per 100 counts) 65-5

Basing points, light rails—Pittsburgh,
Chicago, Birmingham; spikes and tie
plates—Pittsburgh, Chicago, Portsmouth,
Ohio, Weirton, W. Va., St. Louis, Kansas
City, Minnequa, Colo., Birmingham and
Pacific Coast ports; tie plates alone—
Steelton, Pa., Buffalo; spikes alone—
Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	.... \$20.00 to \$21.00
Domestic, f.o.b. Ohio River land- ing barges	.... 20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	.... 20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	.... Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illi- nois and Kentucky mines	.... 31.00
As above, in bags, f.o.b. same mines	.... 32.60

REFRACTORIES

Fire Clay Brick Per 1000 f.o.b. Works

Super-duty brick at St. Louis	.... \$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	.... 47.50
First quality, New Jersey	.... 52.50
Second quality, Pennsylvania, Maryland, Kentucky, Mis- souri and Illinois	.... 42.75
Second quality, New Jersey	.... 49.00
No. 1 Ohio	.... 39.90
Ground fire clay, per ton	.... 7.10

Silica Brick

Pennsylvania	.... \$47.50
Chicago District	.... 55.10
Birmingham	.... 47.50
Silica cement, net ton (Eastern)	.... 8.55

Chrome Brick Net per Ton

Standard f.o.b. Baltimore, Plym- outh Meeting and Chester	.... \$50.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	
As above, in bags, f.o.b. same mines	.... 61.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	.... \$72.00
Chemically bonded, f.o.b. Balti- more	.... 61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks) (—)*
Domestic, f.o.b. Baltimore and Chester in sacks	.... \$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	.... 22.00

*None available.

OVERHEAD Electric Traveling Cranes CAPACITIES 1 TO 450 TONS



• Welded Box Girder Crane equipped with Shepard Niles 5-Speed Push Button Control for hoist, trolley and bridge motors.

• 33 Shepards speed assembly for this machine tool manufacturer. Here again Shepard Niles planned load-handling is paying dividends. Every process that needs a lift is served by a Shepard Niles crane or hoist—production moves swiftly and surely, with never a hitch or a halt. All along the production line—wherever you need a lift—there's a Shepard Niles crane or hoist of the exact type and capacity for the job.

**WELDED
GIRDER
TYPE**
•
CAPACITIES
1 TO 15 TONS
RIVETED BOX
GIRDER TYPE
1 TO 450 TONS



356 SCHUYLER AVENUE . . . MONTOUR FALLS, N.Y.

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00

Domestic, 26 to 28%.....49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....\$74.50*

50% (ton lots, packed).....87.00*

75% (carload lots, bulk).....135.00*

75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....\$28.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots

Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon.....17.50c.
1% carbon.....18.50c.
0.10% carbon.....20.50c.
0.06% carbon.....21.00c.

Spot prices are 1/4c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size,

Bulk, on Contract

3% carbon.....\$113.00*
2.50% carbon.....118.00*
2% carbon.....123.00*
1% carbon.....133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload.....\$2.00

Ferrotungsten, 100 lb. and less.....2.25

Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots.....\$2.25†

Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....\$142.50

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract per net ton.....\$157.50

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton.....58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville.....75.00

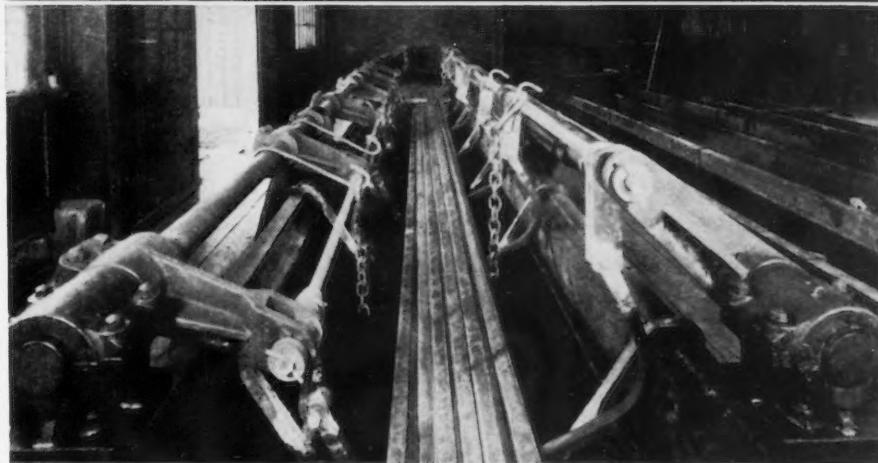
Ferromolybdenum, per lb. Mo, f.o.b. furnace.....95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace.....80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J. 4.20c.
No. 6, f.o.b. Bayonne, N. J. 2.98c.
No. 5 Bur. Stds., del'd Chicago. 3.25c.
No. 6 Bur. Stds., del'd Chicago. 2.75c.
No. 3 distillate, del'd Cleveland. 5.50c.
No. 4 industrial, del'd Cleveland. 5.25c.
No. 5 indus., del'd Cleveland. 5.125c.
No. 6 indus., del'd Cleveland. 4.875c.

True PICKLING ECONOMY



True Pickling Economy is measured

by steady—day by day performance rather than in flashy, single showings:

Wheeling Bronze Mechanical Pickling machines used for pickling strip—cold drawn bars and tubing—have that inbuilt stamina that is the basis of reliable performance. Low maintenance cost.

WRITE TODAY FOR FULL PARTICULARS

**WHEELING
BRONZE CASTING CO.**

WHEELING, W. VA.

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$5.50 to \$5.75
Foundry, f.o.b. Connellsville, prompt	\$6.00 to \$6.50
F'dry, by-product, Chicago	10.50
F'dry, by-product, New England	13.00
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia	11.63
F'dry, by-product, Cleveland	11.55
F'dry, by-product, Cincinnati	11.00
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	\$10.75 to \$11.00

BRITISH

<i>Per Gross Ton, f.o.b. United Kingdom Ports</i>	
Ferromanganese, export	£29 16s. 3d.
Tin plate, per base box.	32s. to 33s.
Steel bars, open hearth	£16 10s.
Beams, open hearth	£19 10s.
Channels, open hearth	£19 10s.
Angles, open hearth	£15 10s.

Black sheets, No. 24, gage
£22 5s. max.* £22 5s. min.**

Galvanized sheets, No. 24 gage
£25 12s. 6d. max.*; £25 12s. 6d. min.**

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston.....	\$25.50	\$25.00	\$26.50	\$26.00	.....
Brooklyn.....	27.50	.....	.....	28.00	.....
Jersey City.....	26.53	26.03	27.53	27.03	.....
Philadelphia.....	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.....	\$25.00	\$24.50	\$26.00	\$25.50	.....
Everett, Mass.....	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.....	25.00	24.50	26.00	25.50	.....
Steelton, Pa.....	.....	24.50	.....	.....	29.50
Birdsboro, Pa.....	25.00	24.50	26.00	25.50	29.50
Sparrows Point, Md.....	25.00	24.50	.....	.....	.....
Erie, Pa.....	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.....	24.00	23.50	24.50	24.00	.....
Sharpsville, Pa.††.....	24.00	23.50	24.50	24.00	.....
Buffalo.....	24.00	23.00	25.00	24.50	29.50
Cincinnati.....	24.44	24.61	.....	25.11	.....
Canton, Ohio.....	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio.....	25.94	25.44	26.44	25.94	.....
St. Louis.....	24.50	24.02	.....	.....	.....
Chicago.....	24.00	23.50	24.50	24.00	.....
Granite City, Ill.....	24.00	23.50	24.50	24.00	.....
Cleveland.....	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio.....	24.00	23.50	.....	24.00	.....
Toledo.....	24.00	23.50	24.50	24.00	.....
Youngstown††.....	24.00	23.50	24.50	24.00	.....
Detroit.....	24.00	23.50	24.50	24.00	.....
St. Paul.....	26.63	.....	27.13	26.63	.....
Duluth.....	24.50	.....	25.00	24.50	.....
Birmingham.....	20.38	19.00	25.00	.....	.....
Los Angeles, San Francisco and Seattle.....	27.50	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....
Montreal†.....	27.50	27.50	.....	28.00	.....
Toronto†.....	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fee..... \$23.50

Lake Superior fee..... \$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

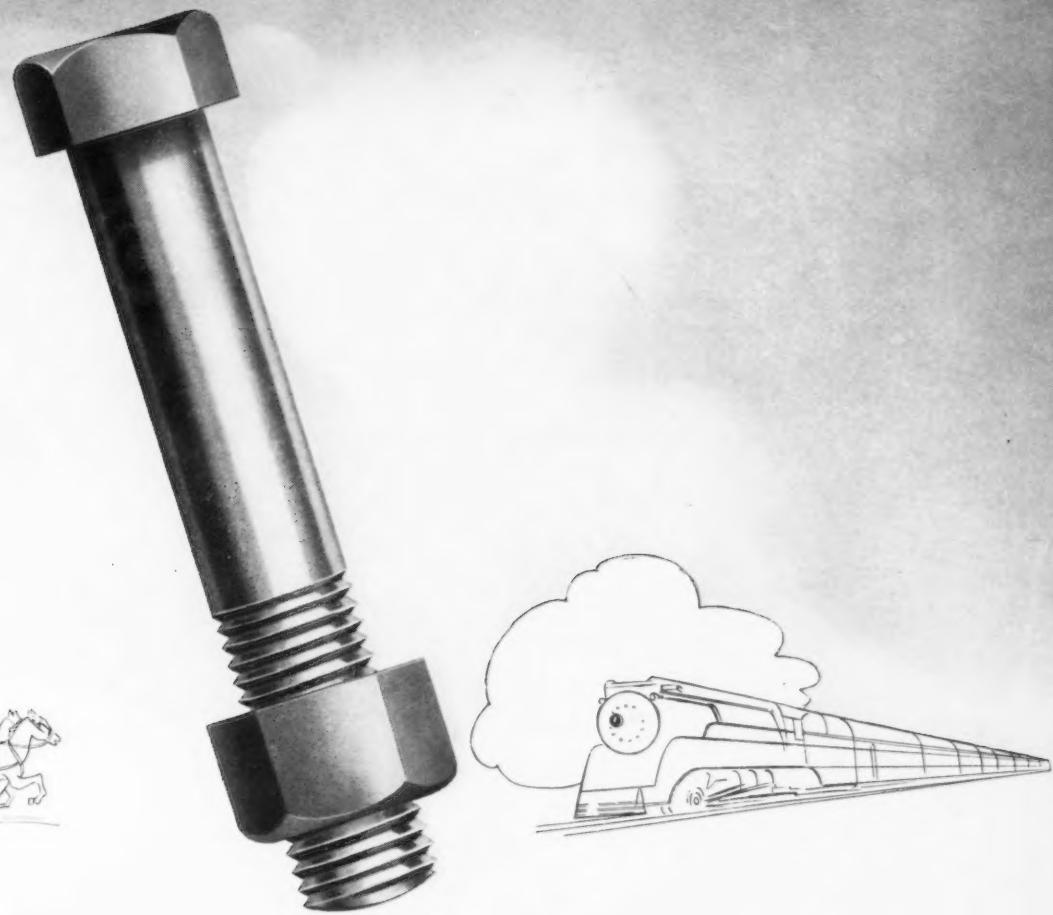
††Pittsburgh Coke & Iron and Struthers furnaces are quoting \$24.50 a ton for No. 2 foundry, basic and malleable, and \$25.00 a ton for bessemer iron at Sharpstown and Youngstown.

WAREHOUSE PRICES

Pitts- burgh	Chi- cago	Cleve- land	Phi- la- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	St. Mil- waukee	Los Angeles	
Sheets, hot rolled	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.23	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$4.30
Sheets, cold rolled	.....	4.10	4.05	4.05	4.40	4.30	4.30	3.68	.....	4.12	4.35	4.23	6.50
Sheets, galvanized	4.75	4.60	4.62	4.90	5.00	4.64	4.75	5.11	4.75	4.87	4.75	4.98	5.25
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.48*	3.82	4.06	3.70	3.74	3.65	3.73	...
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.22	3.46	.....	3.61	3.83	3.54	...
Plates.....	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.35	3.69	3.80	3.68	4.15
Structural shapes.....	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled.....	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.15
Bars, cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.55	7.31	7.60	7.42	7.35	7.50	.....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.40	8.56	8.84	8.45	8.40	8.63	.....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100.	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.23.

BOLTS:
Plow - S
Wheel -
- Auto
Heat
- Cas
Mac
Sulph
- Co
Pin
Ho
ce



OLD FASHIONED IN PRINCIPLE

Yet a modern Invention

BOLTS: Carriage - Machine - Lag -
Plow - Stove - Elevator - Step - Tap -
Wheel & Rim - Battery - U-Bolts - Tire
-Automotive - Drilled - Faced - Special
Heat Treated, etc. - **NUTS:** Cold
Punched - Semi-Finished - Hot Pressed
- Case Hardened - Slotted - Castle -
Machine Screw - Marsden Lock - Low
Sulphur - **RIVETS:** Standard - Tinner's
- Coopers' - Culvert - Clevis and Hinge
- **SCREWS:** - Cap - Machine -
Pins - **Hanger:** - Sheet Metal - Phillips Re-
cessed Head - **WASHERS:** Plate - Burrs -
- **MATERIALS:** Steels - Alloys - Brass -
Bronze - Naval Brass - Everdur - Her-
culey - and others - **RODS:** Stove -
Seat - Ladder - **PLATED PARTS:** Cad-
mium - Zinc - Chromium - Nickel - Hot
Galvanized - Copper - Tin - **SPECIAL**
UPSET & PUNCHED PRODUCTS.

In *principle*, this bolt is the same fastening that has been used for centuries. Yet even twenty years ago, no one had yet learned how to make it with the strength, accuracy and finish that it has today.

For its substance is one of the steel industry's latest accomplishments, its outlines are defined by the newest production machines and tools, its surface epitomizes the progress of finishing techniques — and its cost is a salute to mass production at its best.

This is an **EMPIRE** Bolt, typical of the development of all RB&W threaded fastenings, well known to industry almost a century. For since its inception in 1845, RB&W has always kept pace with progress — in both quality and service.

A program of plant expansion, machinery additions and raw material accumulation, always a part of RB&W foresight, is still being followed to insure unfailing dependability of service and products in the months ahead.

To obtain *modern* industrial fastenings, supplied with the best of *modern* service, specify **EMPIRE**, the products of a *modern* company.



RUSSELL, BURDSALL & WARD
BOLT AND NUT COMPANY

PORT CHESTER, N.Y.

ROCK FALLS, ILL.

CORAOPOLIS, PA.

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **J. Stevens Arms Co.**, Chicopee Falls, Mass., firearms, has let general contract to Ernest F. Carlson, Inc., 1694 Main Street, Springfield, Mass., for extensions and improvements in former local plant of Westinghouse Electric & Mfg. Co., recently acquired for expansion. Cost about \$60,000 exclusive of equipment.

Cornell-Dubilier Electric Corp., Hamilton Boulevard, South Plainfield, N. J., capacitors, condensers and other electrical equipment, has purchased former mill of Kendall Mills, Inc., textiles, at New Bedford, Mass., and will modernize for branch plant.

Pratt & Whitney Division, United Aircraft Corp., East Hartford, Conn., airplane engines and parts, has let general contract to Wadham, May & Carey, Inc., 15 Lewis Street, Hartford, for six one-story additions for expansion in testing department. Cost over \$200,000 with equipment.

Atlas Tack Corp., Fairhaven, Mass., nails, rivets, bottle caps, special machinery and parts, has acquired land and one-story buildings, about 100,000 sq. ft. of floor space, at Henderson, Ky., and will modernize for branch plant. Equipment installation is estimated to cost about \$100,000.

Acco Products, Inc., 24-02 Thirty-ninth Avenue, Long Island City, metal files, paper clips and other metal specialties, has asked bids on general contract for three-story and basement addition, 50 x 100 ft. Cost over \$85,000 with equipment.

Certain-Teed Products Corp., 100 East Forty-second Street, New York, roofing and building products, etc., has approved plans for one-story addition to branch mill at Savannah, Ga., superstructure to be placed under way at once. Cost over \$175,000 with equipment.

B. & J. Auto Spring Co., 118 Tenth Avenue, New York, automobile springs, brakes, etc., has leased one-story building, about 10,000 sq. ft. of floor space, to be erected at Tenth Avenue and West Twentieth Street, for new shop. Charles R. Krieg, Inc., 274 Madison Avenue, is contractor; Charles L. Calhoun, 101 Park Avenue, is architect.

Radio Corp. of America, Inc., 30 Rockefeller Plaza, New York, has let contract to H. K. Ferguson Co., Hanna Building, Cleveland, for design and construction of new laboratory at Princeton, N. J., comprising several one and multi-story units for radio research and product development. Cost close to \$1,000,000 with equipment.

Rheem Mfg. Co., Inc., 30 Rockefeller Plaza, New York, steel barrels, drums and other steel containers, has filed plans for new one-story plant at 7602-50 South Kedzie Avenue, Chicago, 350 x 500 ft., to be operated in conjunction with present works at 3425 South Kedzie Avenue. Cost close to \$700,000 with equipment.

Crucible Steel Co. of America, Inc., 405 Lexington Avenue, New York, plans three one-story shop additions at plant, Harrison, N. J., 200 x 560 ft., 130 x 175 ft., and 80 x 560 ft., respectively. Cost over \$650,000 with equipment.

Sanimetal Tile Corp., 101 Park Avenue, New York, metal tiles, has acquired a two-story building, 50 x 140 ft., on Taylor Street, Washington, N. J., and will improve for new plant.

Corrosion Control Corp., 212 Wright Street, Newark, N. J., industrial paints, has purchased one-story building, about 18,000 sq. ft. of floor space, at Norwalk, Conn., heretofore held by Superior Castings Co., and will modernize for new plant.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until April 7 for industrial wagon trucks,

hydraulic lift trucks, four-wheel trailer and master lift truck (Circular 1953), centrifugal pump (Circular 1962), carriage bolts (Circular 1949).

Otto Bernz Co., 280 Lyell Avenue, Rochester, N. Y., blow-pipes, torches and kindred equipment, affiliated with Graves Elevator Co., same address, plans one-story addition. Cost close to \$70,000 with equipment.

International Graphite & Electrode Corp., Niagara Falls, N. Y., graphite and carbon products, electrodes, etc., has taken out permit for one-story addition, 128 x 300 ft. Cost close to \$200,000 with equipment, which will double present plant capacity.

Elmira Aviation Ground School, Municipal Airport, Elmira, N. Y., plans one-story addition to machine and mechanical shops. Cost close to \$50,000 with equipment.

Brewster Aeronautical Corp., 6 East Forty-fifth Street, New York, has let general contract to George A. Fuller Co., 597 Madison Avenue, for new plant at Hatboro, Pa. It will consist of main one-story structure, 600 x 600 ft., with smaller units, for assembling fighter and bomber type aircraft. Cost close to \$2,000,000 with equipment. Output will be for Government, which has provided fund for project. Silverman & Levy, Architects' Building, Philadelphia, are architects.

Sun Shipbuilding & Dry Dock Co., Chester, Pa., has let general contract to Raymond Concrete Pile Co., 140 Cedar Street, New York, for four new shipways on adjoining tract, to include outfitting dock, one-story shops and other structures for construction of vessels for Navy Department, which will provide fund of about \$2,500,000.

Public Works Office, Building No. 1, Navy Yard, Philadelphia, asks bids until April 9 for six monorail cranes, each with 2-ton electric hoists, and two runways, each about 250 ft. long (Specification 10093).

National Gypsum Co., 190 Delaware Avenue, Buffalo, building products, has approved plans for expansion and improvements in lime dehydrating and plaster mill at Bellefonte, Pa., including new kilns and equipment; also will make extensions in local mining properties. Cost over \$300,000 with machinery.

American Car & Foundry Co., 30 Church Street, New York, has approved plans for two one-story additions to branch plant at Berwick, Pa., 40 x 240 ft., and 40 x 200 ft., respectively. Cost over \$125,000 with equipment.

Coast Guard Office, Curtis Bay, Baltimore, asks bids until April 16 for two diesel-electric whirley cranes on traveling gantry towers, and for one electric whirley crane on traveling gantry tower; also for one combined shop building.

Bartlett Hayward Division of Koppers Co., 200 Scott Street, Baltimore, gas plant equipment, gas holders, etc., has leased part of building at 611 South Monroe Street for expansion.

Quartermaster, Marine Corps, Navy Building, Washington, asks bids until April 7 for two four-cylinder diesel engines and accessories (Schedule 1151).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 8 for four motor-driven floor pedestal chaser grinders (Schedule 5957), 15 35-ton, hand-operated hydraulic arbor presses, six 75-ton similar presses; 18 5-ton floor pedestal, hand-operated arbor presses, six 3-ton similar presses; three 500-lb. bench-type, hand-operated arbor presses (Schedule 5978), seven motor-driven pipe and bolt-threading machines (Schedule 5956), one fork truck (Schedule 5977), one large and one small tractor (Schedule 5976); until April 10, nippers and pliers (Schedule 5966), calipers, dividers, gages, squares, levels, planes, etc. (Schedule 5946).

chain hoists (Schedule 5982), about 125,000 lb. of brass boat facings (Schedule 5950), 2400 electric drills and 160 electric hammers (Schedule 5972) for Eastern and Western yards.

The South

• **International Harvester Co., Inc.**, 180 North Michigan Avenue, Chicago, has leased one and two-story building, 400 x 800 ft., to be erected by Board of Port Commissioners, New Orleans, on Industrial Canal, for new factory branch, storage and distributing plant. Bids for building will be asked soon. Cost over \$1,000,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until April 7 for one 20-ton electric motor-operated transfer crane trolley for hydroelectric power station at Watts Bar Dam, Tenn.

Fisher Body Division, General Motors Corp., Detroit, plans one-story additions to branch plant at Memphis, Tenn., about 600,000 sq. ft. of floor space, for production of parts for twin-engine medium bombing planes for War Department. Fund of \$6,875,000 has been authorized by Government for project, of which \$4,475,000 will be used for purchase of equipment and remainder, \$2,400,000, for building construction. Output of new plant will be used at new bombing plane assembling works of Government to be built at Kansas City, Kan., and operated by North American Aviation, Inc., Inglewood, Cal.

Texas Co., 720 San Jacinto Street, Houston, Tex., plans new experimental gas-oil distillate recovery plant in Paradise oil field area, St. Charles Parish, La. It will include compressor station, power house, machine shop and other structures, with steel tank storage division. Cost over \$450,000 with equipment.

R. H. Bogle Co., Alexandria, Va., industrial and other chemicals, has acquired property formerly used by Memphis Hardwood Flooring Co., Mallory Street, Memphis, Tenn., for new plant. Cost close to \$200,000 with machinery.

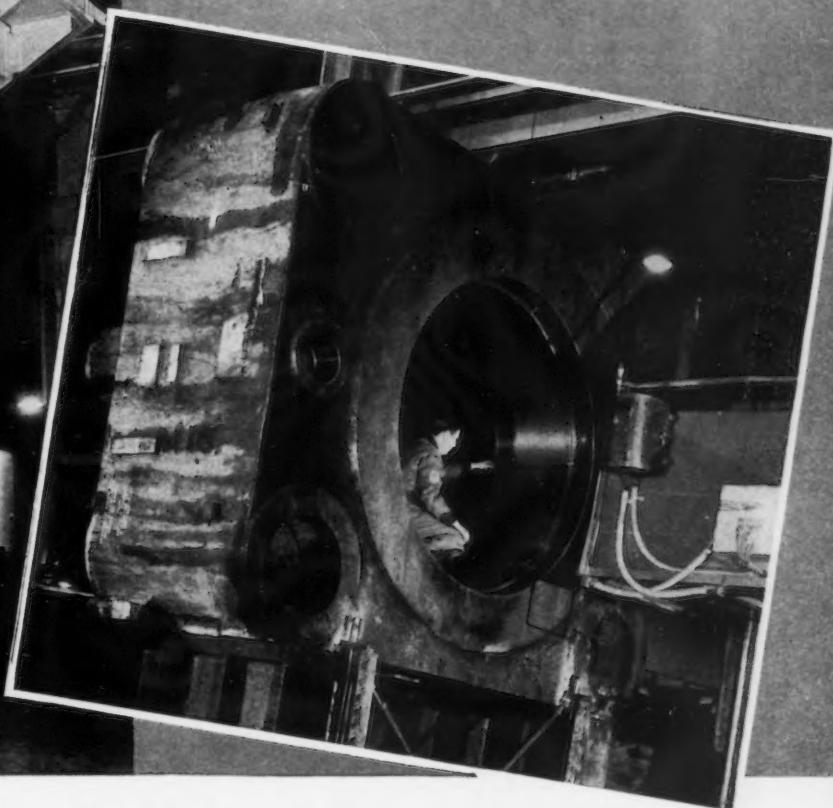
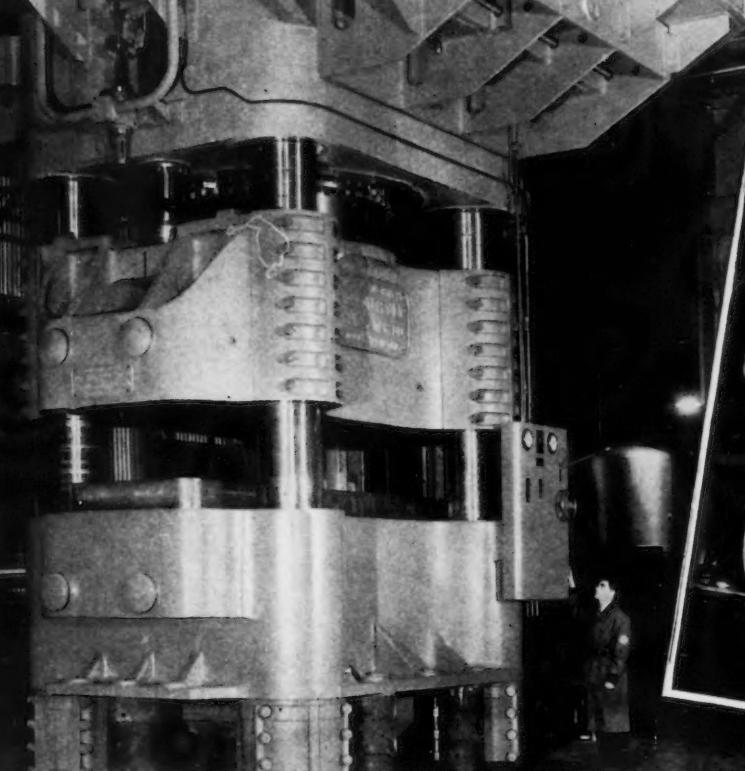
Hygeia Coca-Cola Bottling Co., Pensacola, Fla., has let general contract to Beers Construction Co., 70 Ellis Street, N. E., Atlanta, Ga., for new one-story mechanical-bottling, storage and distributing plant at DeFuniak Springs, Fla. Cost close to \$140,000 with equipment. Francis P. Smith, Norris Building, Atlanta, is architect.

South Carolina Gas & Electric Co., Charlotte, N. C., an interest of Duke Power Co., plans expansion and improvements in transmission and distributing systems, power stations and other facilities at Columbia, S. C., and vicinity. Appropriation of about \$1,000,000 is being arranged for work.

Houston Shipbuilding Corp., Chronicle Building, Houston, Tex., recently organized subsidiary of Todd Shipyards Corp., New York, has let contract to Rust Engineering Co., Clark Building, Pittsburgh, for 12 one-story buildings at new shipyard on Irish Island in Houston ship channel, including mold loft, machine shop, paint shop, foundry, storage and distributing shops and other structures. Cost about \$750,000. Contract also has been awarded to Brown & Root, Inc., 4300 Calhoun Road, Houston, for clearing of plant site, ship runways and other construction, at cost of about \$1,000,000. Plant will include six shipbuilding berths and will be used for construction of vessels for Maritime Commission, Washington. Fund of \$4,680,000 will be provided by Government.

San Antonio Machine & Supply Co., 325 North Centre Street, San Antonio, Tex., machinery and parts, has asked bids on general contract for new one-story plant, 175 x 400 ft., for storage and distribution. Cost over \$75,000 with equipment. Brock, Roberts &

5000 TONS PRESSURE...



and STEEL CASTINGS take it!



Do you know why one of America's largest builders of

self-contained hydraulic presses specifies steel castings for all major press parts, cylinder, platen, and bed? It is because steel castings do the job best!

The H-P-M press illustrated here weighs 700,000 pounds and has a pressure capacity of 5000 tons. It is used to cut and form many different metal aircraft parts at a single pressing. Aircraft parts must be made interchangeable, therefore, precision press operation is required.

H-P-M engineers say—"We do not believe that any other material could possibly stand up as well as cast steel under the tremendous pressures and strains involved, still maintain

precision alignment, give adequate rigidity and resist fatigue.

"And certainly no other material or process would contribute so much saving of time, work and cost in building the press itself."

Whatever you make, look into steel castings when writing your specifications and planning your production. Steel castings bring you strength where you want it, without excess weight. They bring you a wide choice of mechanical properties, ease of machining and finishing, combinations of parts that save handling and assembly time—all contributing toward a better finished product at lower cost.

For more information, consult your local foundry, or write to Steel Founders' Society of America, 920 Midland Bldg., Cleveland, Ohio.

FOLLOW THE EXAMPLE OF THE MODERN PRESS BUILDER — MODERNIZE YOUR PRODUCT WITH

STEEL CASTINGS

Anderson, Jones Building, are architects; Matthews & Keenan, Smith-Young Tower Building, are engineers.

Central States

• **Acme Machine Tool Co.**, 4955 Spring Grove Avenue, Cincinnati, turret lathes, screw machinery, etc., has asked bids on general contract for one-story addition, 40 x 102 ft. Cost over \$60,000 with equipment. Rapp & Meacham, Times-Star Building, are architects.

Addressograph-Multigraph Corp., 1200 Babcock Road, Cleveland, addressing and printing machines, and parts, has let general contract to H. K. Ferguson Co., Hanna Building, for one-story addition, about 76,800 sq. ft. floor space. Cost close to \$750,000 with equipment.

National Cash Register Co., South Main Street, Dayton, Ohio, has let general contract to Industrial Building Co., Reibold Building, for one-story addition, 160 x 360 ft., with three monitors for mezzanine floor, totaling about 57,000 sq. ft. floor space in all, for expansion in punch press division. Structure will be used largely for Government orders. An overhead traveling crane will be installed. Cost close to \$500,000 with equipment.

Wellman Bronze & Aluminum Co., 6017 Superior Avenue, Cleveland, castings, bearings, bushings, etc., has let general contract to H. G. Slatmyer & Son Construction Co., 203 Lakeside Avenue, N. W., for one-story addition, 65 x 115 ft. Cost close to \$60,000 with equipment. Frank Haushka, Ninth-Chester Building, is architect.

Jeffrey Mfg. Co., East First Avenue, Columbus, Ohio, elevating and conveying machinery, has let general contract to E. Elford & Son, 555 South Front Street, for one-story addition, 80 x 100 ft., for a welding shop. Cost close to \$50,000 with equipment.

Wellman Engineering Co., 7000 Central Avenue, Cleveland, coal-handling equipment, steel mill and other heavy machinery, plans early reopening of former branch plant at Akron, Ohio, now used for storage by Firestone Tire & Rubber Co., Akron. Structures will be improved for production of armament for Government.

Goodyear Aircraft Corp., East Market Street, Akron, Ohio, recently organized subsidiary of Goodyear Tire & Rubber Co., plans new works for production of parts for bombing and other type fighting airplanes for Government. Cost over \$1,000,000 with machinery.

Board of School Trustees, Anderson, Ind., Arthur Campbell, 1301 Lincoln Street, school superintendent, will take bids soon on general contract for new three-story trade and vocational high school, 60 x 144 ft., with one-story extension, 145 x 240 ft. Cost about \$200,000 with equipment. Erwin F. Miller, Anderson Bank Building, is architect.

Stone & Webster Engineering Corp., 49 Federal Street, Boston, engineer and contractor, has been awarded contract by War Department and Bridgeport Brass Co., Bridgeport, Conn., for new plant in vicinity of Stout Airfield, Indianapolis, for production of cartridge cases for Government. It will comprise one and multi-story units, power house and other structures. Cost about \$11,500,000 with equipment, amount to be provided by Government.

General Motors Truck & Coach Co., 2640 Washington Avenue, St. Louis, division of Yellow Truck & Coach Mfg. Co., Pontiac, Mich., has let general contract to Boaz-Kiel Construction Co., 4030 Chouteau Avenue, for one-story factory branch, service and distributing plant, 215 x 255 ft. Cost over \$200,000 with equipment.

Duke Mfg. Co., 2217 North Broadway, St. Louis, enameled cooking and serving equipment, is erecting new one-story plant, 175 x 181 ft., at 2305 North Broadway, for which general contract recently was let to A. D. Gates Construction Co., 4564 Theodosia Street. Cost close to \$115,000 with equipment. Klingensmith & Grover, 4232 West Pine Street, are architects.

Water Department, City Hall, Kansas City, Mo., K. K. King, director, is planning immediate call for equipment bids for new water softener plant for municipal waterworks, including soda ash and chemical feed machinery, conveying equipment, flocculators and

clarifying machinery, and auxiliary equipment. Cost over \$600,000. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, is consulting engineer.

Frost Gear & Forge Co., Division of Clark Equipment Co., Jackson, Mich., automobile gears and transmissions, has approved plans for one-story addition, 150 x 300 ft. Cost close to \$150,000 with equipment.

Grieder Machine Tool & Die Co., 2114 East Woodbridge Avenue, Detroit, has asked bids on general contract for one-story addition. Cost about \$50,000 with equipment. Lyndon, Smith & Winn, Murphy Building, are architects.

Monsanto Chemical Co., 1700 South Second Street, St. Louis, will begin superstructure for main units for new plant at Trenton, Mich., for which general contract recently was let to Esslinger-Milsch Co., 159 East Columbia Street, Detroit, with power house, machine shop and auxiliary buildings. Cost over \$2,000,000 with equipment. Harley & Ellington, Stroh Building, Detroit, are architects.

Gits Brothers Mfg. Co., 1846 South Kilbourn Avenue, Chicago, oil and grease cups, and kindred equipment, has let general contract to Kinnare Corp., 2816 West Monroe Street, for one-story addition, 55 x 275 ft. Cost over \$85,000 with equipment. W. P. Fox, 737 North Michigan Avenue, is architect.

Lewis School of Aeronautics, Lockport, Ill., has let general contract to McGrath & Swanson, South Chicago, Ill., for one-story addition, 35 x 108 ft., for storage, distribution and other service. Cost close to \$50,000 with equipment. H. T. Liebert, 5112 North Kenmore Avenue, Chicago, is architect.

McCulloch Engineering Co., 3227 North Thirty-first Street, Milwaukee, automobile equipment and accessories, has asked bids on general contract for one-story addition, 150 x 200 ft., primarily for a machine shop, with part reserved for office. Cost close to \$100,000 with equipment. Eschweiler & Eschweiler, 720 East Mason Street, are architects.

Mid-Continent Air Lines, Inc., 120 South Seventh Street, Minneapolis, Minn., has leased steel hangar, 130 x 150 ft., with two-story repair and reconditioning shop adjoining, 30 x 140 ft., to be erected by Municipal Board of Park Commissioners, City Hall, at Wold Chamberlain airfield. Bids for construction will be asked early this month. Larson & McLaren, Foshay Tower Building, are architects.

Buick Motor Division, General Motors Corp., Flint, Mich., has let general contract to Thorngren & Erickson Co., 228 North LaSalle Street, Chicago, for new plant at Melrose Park, Ill., for production of airplane engines for Government, consisting of two main one-story units, 752 x 1305 ft., and 60 x 268 ft., and three-story office building, 50 x 274 ft. Entire project will cost about \$30,000,000 and fund in that amount has been authorized by Government. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Northwest Engineering Corp., Green Bay, Wis., cranes, draglines and other heavy machinery, has asked bids on general contract for two-story addition, 20 x 240 ft., for expansion in structural shop and other departments. Cost close to \$75,000 with equipment.

Board of City Trustees, Lamoni, Iowa, asks bids until April 14 for extensions and improvements in municipal power plant, including new diesel engine-generating unit, 375-475-bhp. capacity, and auxiliary equipment. A. S. Harrington, Baum Building, Omaha, Neb., is consulting engineer.

Armour & Co., Union Stock Yards, Chicago, have let general contract to Charles B. Johnson & Sons, 6 North Michigan Avenue, for one-story plant unit, 90 x 125 ft., at 3158-3202 South Thropp Street, for expansion in by-products plants, for production of soap, glue, etc. Cost over \$85,000 with equipment. F. A. Lindberg, first noted address, is company engineer.

Salerno-Megowen Biscuit Co., 4500 West Division Street, Chicago, has let general contract to Sivert Kiefstad, 6317 North Hiawatha Avenue, for two-story and basement addition, 100 x 200 ft. Cost close to \$100,000 with mechanical-handling machinery, ovens and other equipment.

Western States

• **Argo Blower & Mfg. Co.**, 5400 East Marginal Way, Seattle, mechanical draft equipment, parts, etc., plans one-story addition, 48 x 100 ft. Cost close to \$50,000 with equipment. Jones & Stanley, Medical Arts Building, are architects.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has authorized additional equipment installation in new steam-electric generating station at Oleum, Cal., now in course of construction for service at new oil refinery of Union Oil Co. of California, Inc., at that place, comprising new 44,000-kw. turbine-generator unit and accessory equipment.

Pacific Electric Mfg. Corp., 5815 Third Street, San Francisco, high-tension electrical equipment, has let general contract to R. A. McLean & Co., 602 California Street, for one-story addition. Cost close to \$50,000 with equipment. H. B. Hammill, 381 Bush Street, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 8 for two floor-type sensitive drills (Schedule 6003), three welding sets and spare parts (Schedule 5968), two motor-driven upright drills (Schedule 5970) for San Pedro, Los Angeles, station; one open-side planer (Schedule 5974) for Mare Island Navy Yard.

Reynolds Metals Co., Federal Reserve Bank Building, Richmond, Va., has acquired about 400 acres on Columbia River, Longview, Wash., for new aluminum plant, with storage and distributing buildings, machine shop, boiler plant and auxiliary structures. Equipment will be electrically-operated and power supply will be secured from Bonneville transmission system. General erection contract has been let to Austin Co., Seattle. Plant output will be used by Government, which will provide fund of \$4,200,000 for project.

Union Hardware & Metal Co., 411 East First Street, Los Angeles, has let general contract to Ford J. Twain Co., 816 West Fifth Street, for new one-story storage and distributing plant, about 37,000 sq. ft. floor space, at Central Avenue and Alameda Street, and improvements in building on adjoining site. Cost over \$100,000 with equipment. Albert C. Martin, Higgins Building, is architect.

Canada

• **Canadian National Railways, Ltd.**, 360 McGill Street, Montreal, has let general contract to Durandau & Durandau, Ltd., 5847 Hamilton Street, for one-story machine shop at Point St. Charles, Que. Cost over \$400,000 with equipment. A. B. Ferguson, first noted address, is chief engineer.

Department of National Defense, Division of Munitions and Supply, Ottawa, Ont., has let general contract to Anglin-Norcross Corp., Ltd., 892 Sherbrooke Street West, Montreal, for one-story additions to munition plant at St. Malo, near Quebec, including improvements in present buildings. Cost over \$1,000,000 with equipment. T. Pringle & Son, Ltd., 485 McGill Street, Montreal, is consulting engineer.

Stanley Steel Co., 57 Gerrard Street, Hamilton, Ont., plans one-story addition. Cost close to \$60,000 with equipment. Prack & Prack, 36 James Street South, are architects and engineers.

Pere Marquette Railway, St. Thomas, Ont. C. R. Black, superintendent, has plans for a 10-stall roundhouse and coal dock on Elm Street.

Drummondville Cottons, Ltd., Drummondville, Que., plans \$1,000,000 addition to textile plant. T. Pringle & Son, 485 McGill Street, Montreal, are engineers.

Allied War Supply Corp., 420 Lagauchetire Street West, Montreal, controlled by Canadian government, has appointed Evans & Reid, 1538 Sherbrooke Street West, consulting engineers, in connection with \$10,000,000 munitions plant to be erected in Province of Quebec. Angus Robertson, Ltd., 660 St. Catharine Street West, Montreal, is general contractor.